

Trench Unit	Overall score (0,1, or 2)	Reviewer	Box Plots
TU067	1	JD, DG	<p>RAS results for all rads do not have any variability and are from a different population than all other surveys/samples so they look suspicious.</p> <p>K-40 FSS results very low variability, low concentrations, and indicate a different population</p>
TU068	1	JD, DG	<p>FSS results have very low variability compared to other surveys, especially for K-40, DG K-40 variability changes bewtween sampling events</p>

Q-Q Plots	Rounds of excavation
K-40 in FSS possibly from a different popultaion	3
K-40 in FSS possibly from a different popultaion	3

Gamma scan or static concerns

1 - Sampler name, off-site sample mass and COC forms for samples missing from reports.

2 -Static survey not signed by RSO in SUPR

3 - Raw scan data not in SUPR

4 - Scan and static data do not appear to be consistent: scan data highest result was 4,843 cpm; static data ranged from 2,530-6,240 cpm

Scan data appears to fall within the expected variability (2,608 - 7,560 cpm)

1 - Sampler name, off-site sample mass and COC forms for samples missing from reports.

2 -Static survey not signed by RSO in SUPR

3 - Raw scan data not in SUPR

Scan data appears to fall within the expected variability (2,608 - 7,560 cpm)

On vs offsite lab	Time Series	Suspect name (1=yes, 0=no)	Name, if suspect
According to Data Eval Plan, the on-site vs off-site data are consistent		1	R Roberson
According to Data Eval Plan, the on-site vs off-site data are consistent		0	

Name, if not suspect	Signs of falsifying (1=Yes, 0=no)	Signs of falsification summary	Failure to follow workplan (1=Y, 0=N)
	1	<p>1 -RAS results look suspicious due to very low variability</p> <p>2 - Review form indicates allegations associated with this TU: Former Worker Allegation: RSY-2 laborers missing the required number of samples. Taylor told them to go get a sample "from anywhere." They went behind the Conex to another pad and got an unrelated "false" sample. Allen and Reggie</p> <p>3 - missing COCs and raw scan data in reports</p>	
P Vigil	1	<p>1 -RAS results look faked due to very low variability</p> <p>2 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports</p> <p>3 - Multiple excavations, adjacent to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2</p> <p>4- Population of K-40 on is much more variable on 9/19/07 than the remaining 10 events. From 9/19/07 to 9/20/07 variability drops.</p>	

Signs of failure to follow  
workplan

Missing data and info in  
SUPRs

Comments - Other

This survey unit is suspect for the following reasons:

1 - Former worker allegations regarding screening of soil from this trench unit at the RSY2. This indicates a high potential that FSS results could also have been falsified

2 - RAS results do not have normal variability - suspect for falsification

3 - K-40 FSS results look like they are from a different popultaion than other surveys

4 - COCs and names of samplers missing in SUPR

5 - No RSO signatures on survey results

6 - Raw scan data missing from SUPR

Recommend for re-sampling

This survey unit is suspect for the following reasons:

1 - Variability in sample results for FSS low - suspect for falsification

2 - K-40 FSS results look like they are from a different population than other surveys

3 - COCs and names of samplers missing in SUPR

4 - No RSO signatures on survey results

5 - Raw scan data missing from SUPR

Recommend for re-sampling

Followup needed, e.g. questions for Navy	Recommend for PCA (1 or 0)	Grey area - talk to group	Scoring ranking	
	0	yes	4.5	
	0	Yes, Note 2007 is before allegations re soil falsification began	5.4	



TU069	2	JD, DG	<p>RAS results for all radionuclides have low variability and for Ac-228 and Bi-214, indicate RAS results are from a different population than all other surveys/samples.</p> <p>K-40 FSS results have very low variability, low concentrations, and indicate there are different populations among the surveys, DG K-40 variability changes between sampling events</p>
TU071	2	DG, DK; JD	<p>RAS samples show different population for Bi-214</p> <p>K-40 FSS-Bias have a large variability indicating either heterogeneous soil or potentially different soil populations</p>
TU072	2	DK; KB; JD	No anomalies noted
TU073	2	DK; JD	No anomalies noted

K-40 in FSS from a different popultaion	3
<p>RAS K-40 results look different than other two surveys, however only two RAS samples were collected.</p> <p>K-40 FSS-Bias has a wider range of values.</p>	1
No anomalies	3
No anomalies noted, K-40 slope slightly different in SYS_1 but this is due to one or more low results in this set of data.	3

1 - Sampler name, off-site sample mass and COC forms for samples missing from reports.

2 -Static survey not signed by RSO in SUPR

3 - Raw scan data not in SUPR

4 - Scan and static data inconsistent: highest count for statics was 4,676 cpm; scan data ranged from 3,220 - 6,200 cpm

Gamma static survey data highest count was 6,165 cpm; scan survey data ranged from 4,000 - 7,500 cpm.

No range was provided for the Static survey data.

No signature and date from RSO recorded on the Static Data

Scan survey data not available for review, and no signature or date is recorded from the RSO.

The Data Eval Form states the static data (highest count was 4,279 cpm) are inconsistent with the scan results (3,890-6,720 cpm)

COCs not provided in SUPR

Scan data (highest count was 4,673 cpm) and Static data (4,240 - 8,750) are not consistent.

RSO signature and date missing from survey data, sampler not identified in SUPR

According to Data Eval Plan, the on-site vs off-site data are consistent	Sys-1 and FSS-Bias results for K-40 are from a different population than the RAS of FSS. This indicates there may be different populations of soils/samples represented between the different surveys.	1	A Jahr
According to Data Eval Plan, the on-site vs off-site data are consistent	Cs-137 results were mostly non-detect or negative. Cs-137 results should not be mostly negative. This indicates a potential data quality issue.	0	
According to Data Eval Plan, the on-site vs off-site data are consistent	No trends identified	1	R Roberson
According to Data Eval Plan, the on-site vs off-site data are consistent	No trends identified.	0	

	1	<p>1 -RAS results for all radionuclides have low variability.</p> <p>2 - Ac-228 and Bi-214 RAS results are from a different population than all other surveys/samples</p> <p>3 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports</p> <p>4 - Multiple excavations, near to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2, DG K-40 more variable on 9/19/07 and 10/17/07 than other sampling events.</p> <p>5 - Worker involved in allegations included in sample team</p> <p>6 - K-40 more variable on 9/19/07 and 10/17/07 than other sampling events.</p>	1
P Vigil	1	<p>1 - Scan survey data not available for review</p> <p>2 - Static data range not provided in Data Eval Form.</p> <p>3 - No RSO signature and date provided for static or scan data</p>	1
	1	<p>1 - Inconsistent scan and static data; highest count for static survey was 4,279 cpm where scans ranged from 3,890 - 6,720 cpm</p> <p>2 - SUPR missing COCs</p> <p>2 - Worker involved in allegations included in sample team</p>	1
P Vigil	1	<p>1 - Scan and Static data inconsistency; narrow range of static data values which is not consistent with environmental monitoring.</p> <p>2 - RSO signature on scan and static data results is missing</p> <p>3 - Suspect worker involved with data collection</p>	0

SUPRs missing COCs, RSO signatures and dates, and scan data

1 - RSO signature missing on static and scan data

2 - Section 4 of Data Eval Form states "No gamma scan data was available for review to compare with the FSS samples specific dataset static/scan results."

COCs not provided in SUPR as documentary evidence of sample integrity, date and time of collection and arrival at laboratory.

This survey unit is suspect for the following reasons:

1 - RAS results do not have normal variability and are from different population than other surveys for Ac-228 and Bi-214 - suspect for falsification

2 - K-40 FSS results look like they are from a different population than other surveys

3 - COCs and names of samplers missing in SUPR

4 - No RSO signatures on survey results

5 - Raw scan data missing from SUPR

6 - Worker involved in allegations performed work at this TU

Recommend for re-sampling

1 - Remediation was performed due to Cs-137, the time series plots show that most of the characterization results for Cs-137 were at or near zero, or were negative values. This indicates a data quality issue, and thus, un-reliable data.

2 - Gamma scan data missing, and no RSO signature and date on static and scan data.

Recommend resample to confirm ROC concentrations for Ra-226 and Cs-137

1 - Scan and Static data are inconsistent

2 - SUPRs do not contain COCs for samples collected. Without this documentary evidence, the integrity, location, date, time or evidence of who had custody of the samples is missing. Therefore, the data is not defensible and not usable for decision making.

Recommend resample to confirm ROC concentrations

1 - TU is downstream from Building 274 used for decontamination training and offices, Building 322 used by NRDL for development of radiation detection instrumentation (no contamination found and building demolished), and Buildings 313, 313A used by NRDL for Instrumentation laboratory and as stockroom and storage areas.

2 -Cs-137 was found above the action level in 2002; but no evidence of residual radioactivity above the release criteria was found in 2014.

	0		5.4	
<p>Section 4 of Data Eval Form states "No gamma scan data was available for review to compare with the FSS samples specific dataset static/scan results."</p> <p>Need explanation on what this means.</p>	0		8.2	
			7.2	10
		Review with group	6.6	13



TU074	2	JD	No comparisons made - only one set of FSS data collected. Data are highly variable
TU075	2	JD, DG	Each event for each ROC has different variability with varying means. RAS and Bias results are slightly higher when compared to SYS-1 or FSS results for Ac-228 and Bi-214; however the number of RAS and FSS-Bias results is small and the differences in concentration ranges are relatively small..

<p>No comparisons made - only one set of FSS data collected</p>	<p>0</p>
<p>RAS and FSS-Bias K-40 data have a different slope than SYS-1 or FSS data sets, however range of values for RAS and FSS-Bias is only slightly different and number of samples is small</p>	<p>2</p>

1 - Scan and static data are inconsistent. Static results ranged from 4,300 - 5,800 cpm; scan ranged from 1,630 - 6,750 cpm.

2 - Low value in scan data unusual because it is below background.

3 - Small range/low variability in Static results

3 - Scan data performed after FSS sample collection.

Data Eval Form noted that there were negative results for Ra-226, low K-40 concentrations, and two results for Ac-228 at or below 0 pCi/g.

Static and scan data are not consistent. Static results ranged from 4,200 - 6,200 cpm; scan data ranged from 1,370 - 7,720 cpm.

Low values in scan data are unusual because these low values are significantly lower than background.

According to Data Eval Plan, the on-site vs off-site data are consistent	It is noted that extremely low results for Ac-228, Bi-214, and K-40 reported on the same days, indicating a potential problem with the data on these dates. Time series plots dates were not legible	0	
According to Data Eval Plan, the on-site vs off-site data are consistent	Ac-228 and Bi-214 RAS and Bias results are from a different population than SYS-1 or FSS results	0	

P Vigil	1	<p>1 - Scan and static data are inconsistent. Static results ranged from 4,300 - 5,800 cpm; scan ranged from 1,630 - 6,750 cpm.</p> <p>2 - Low values in scan data unusual because the low counts per minute are within a range that is below background.</p> <p>3 - Scan data performed after FSS sample collection.</p>	1
P Vigil	1	<p>Inconsistent static data (4,200 - 6,200 cpm) and scan data (1,370 - 7,720 cpm), scan data includes results below background levels.</p> <p>Suspect worker involved in data collection.</p> <p>Each event for each ROC has different variability with varying means.</p>	1

Scan data collected after  
FSS sample collection  
which is a departure  
from the Work Plan.

Section 4 of the Data Eval  
Form states that there  
was no mention of pipe  
swipe surveys or  
sediment sampling in  
manholes. This would  
indicate a deficiency in  
the investigation and a  
departure from the Work  
Plan.

1 - TU074 was not remediated but is adjacent to TUs 81 and 83 which did have contamination.

2 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shop, and offices, a trades shop, and general store. No contamination is expected to have been released from this building; however, TU075 which was also connected to Bldg. 401 did have contamination.

3 - Scan and Static data are inconsistent, with unusually low results in scan data and in FSS data.

4 - Scan was performed after FSS samples collected.

5 - Sampler not identified in SUPR, person responsible for gamma scans and static measurements is listed on the NRC petition as a suspect worker.

Recommend for re-sample

1 - Data Eval Form noted that there were negative results for Ra-226, low K-40 concentrations, and two results for Ac-228 at or below 0 pCi/g. Reviewer comment: this could indicate poor data quality and/or falsification.

2 - Static and scan data are inconsistent. Static results ranged from 4,200 - 6,200 cpm; scan data ranged from 1,370 - 7,720 cpm: Low values in scan data are unusual because these low values are significantly lower than background.

4 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shop, and offices, a trades shop, and general store. The narrative states that no contamination was found on surfaces or drains in the building, therefore it is not expected that contamination released from this building.

5 - Section 4 of the Data Eval Form discusses the contamination that was found in this TU, despite the purported lack of contamination in Bldg 401. The narrative also states that there was no mention of pipe swipe surveys or sediment sampling in manholes, therefore the investigation did not follow the Work Plan and is deficient. This is important to note because contamination was found in this trench.

6 - Suspect worker involved in static/scan surveys

Recommend re-sampling.

			Not available	
<p>Need to look at data more closely to identify possible reasons for data inconsistencies. For example: Were scan and static data sets approved/signed by RSO? Are COCs present in SUPR? Were any data quality issues mentioned in RACR or SUPR?</p>	0		5.8	



TU076	2	JD	All surveys/sample collection results have low and/or non-detect results for Ac-228
TU078	1	JD, DG	<p>All surveys/sample collection results have low and/or non-detect results for Ac-228 except for FSS-Bias results</p> <p>K-40: mean stays the same but spread up and down varies between events</p> <p>Cs-137: negative measurements appear to be remedied in 3/17 2008, 6 sampling events prior contain many negative activity levels</p>

<p>K-40 results have large range of values/variability, especially in FSS.</p>	<p>4</p>
<p>K-40 FSS has large range of values compared to other survey units.</p>	<p>4 to 5</p>

Static and scan data inconsistent. Static ranged from 4,452 - 4,914; scan data ranged from 3,000 - 7,000 cpm

Static and scan data inconsistent. Static ranged from 3,953 - 4,543; scan data ranged from 3,000 - 7,000 cpm

On-site lab reported higher Bi-214 and Ra-226 values than off-site lab.	All surveys/sample collection results have low and/or non-detect results for Ac-228	1	J Cunningham
On-site lab reported higher Bi-214 and Ra-226 values than off-site lab.	All surveys/sample collection results have low and/or non-detect results for Ac-228	0	

	1	<p>1 -Static and scan data inconsistent. Static ranged from 4,452 - 4,914; scan data ranged from 3,000 - 7,000 cpm. Range for static data is too small indicating static data is falsified.</p> <p>2 - All surveys/sample collection results have unusually low and/or non-detect results for Ac-228. This indicates either poor data quality or falsification.</p> <p>3 - Suspect worker involved with data collection.</p>	1
S Brown	1	<p>1 -Static and scan data inconsistent. Static ranged from 3,953 - 4,543; scan data ranged from 3,000 - 7,000 cpm. Range for static data is small.</p> <p>2 - Scan data is reported to be exactly the same as TU076 (3,000 - 7,000 cpm)</p> <p>3 - Unclear whether Scan/Static personnel S. Brown is the same as Emitt Brown from NRC list</p> <p>4 - K-40: mean stays the same but spread up and down varies between events Cs-137: negative measurments appear to be remedied in 3/17 2008, 6 sampling events prior contain many negative activity levels</p>	0

Range of cpm values for static data is too small indicating static data may have been collected at only one or a few locations.

1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings.

2 - Adjacent TUs 078, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results.

3 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification.

4 - Suspect worker involved in data collection.

5 - Probable data quality issues with low Ac-228 results.

Data Eval Form states TU076 is adjacent to Bldg 411. Similarly, TU078 and TU080 are also adjacent to Bldg. 411. Samples collected from all three TUs include several Ac-228 results that are at or below 0, and similarities were observed with samples collected from TU077 which is adjacent to TU076.

Recommend re-sample.

1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings.

2 - Adjacent TUs 076, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results.

3 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification.

4 - It is unclear whether suspect worker was involved in data collection.

Data Eval Form states TU076 is adjacent to Bldg 411. Similarly, TU078 and TU080 are also adjacent to Bldg. 411. Samples collected from all three TUs include several Ac-228 results that are at or below 0, and similarities were observed with samples collected from TU077 which is adjacent to TU076.

Recommend re-sample.

Need to look at data more closely to identify possible reasons for low or non-detect Sc-228 and data inconsistencies. For example: Were scan and static data sets approved/signed by RSO? Are COCs present in SUPR? Were any data quality issues mentioned in RACR or SUPR?	0		Not available	
	0		5	



TU079	1	JD, DG	Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data
TU080	2	JD, DG	Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data
TU082	2	JD, DG	All survey types had very low concentrations of Ac-228, or concentrations at 0; RAS results for Ac-228 also had negative values FSS-BIAS spread different for K-40 then other events however mean is similar. Cs-137 affected by negative values.

<p>Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data</p>	0
<p>Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data</p>	0
<p>No anomalies in trends observed; however Ac-228 results were low, with some reported as 0 or negative (RAS).</p>	2

Static and scan data inconsistent. Static ranged from 5,326 - 5,943; scan data ranged from 3,430 - 6,790 cpm

Static and scan data inconsistent. Static ranged from 6,089 - 7,126 cpm; Scan ranged from 4,250 - 6,500 cpm

RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification.

Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).

According to Data Eval Plan, the on-site vs off-site data are consistent	Variable data, large range of values	0	
On-site lab reported higher Bi-214 and Ra-226 values than off-site lab.	Variable data, large range of values	1	R Zahensky
Data Eval Form states data were consistent	No anomalies in trends observed; however Ac-228 results were low, with some reported as 0 or negative (RAS).	1	J Cunningham

P Vigil	1	Static data (5,326 - 5,943 cpm) and Scan data (3,430 - 6,790 cpm) are not consistent, static data has very narrow range of values compared to what would be expected for environmental conditions.	
	1	Static and scan data inconsistent. Static ranged from 6,089 - 7,126 cpm; Scan ranged from 4,250 - 6,500 cpm	0
	1	<p>1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification.</p> <p>2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).</p>	0


1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079.

2 - Adjacent TUs 076, 078, and TU108; and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0.

3 - Static and scan data are inconsistent; static results ranged from 5,326 - 5,943 cpm and scan data ranged from 3,430 - 6,790 cpm.

4 - Suspect worker involved in data collection.

5 - Probable data quality issues with Ac-228 results.

6 - 1 sampling event

1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079.

2 - Adjacent TUs 076, and TU087 (also adjacent to Bldg. 411); and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0.

3 - Static and scan data are inconsistent; static results ranged from 6,089 - 7,126 cpm and scan data ranged from 4,250 - 6,500 cpm.

4 - Suspect worker involved in data collection.

5 - Probable data quality issues with Ac-228

6 - 1 sampling event

1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification.

2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).

3 - Suspect worker involved with data collection.

4 - TU082 is adjacent to TUs 077, 080, 081 which all included several Ac-228 results at or below 0. Data Eval Form indicates Bi-212 and Pb-212 in the Th-232 decay series were consistent with other sample results in TU082. This may indicate a data quality issue with the analysis and reporting of Ac-228.

Recommend for re-sampling

Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079.	0		Not available	
Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in this building. HRA info is needed to evaluate potential for contamination of sewer lines/TU080.	0		Not available	
	0	Yes		



TU083	2	JD, DG	<p>All surveys resulted in low and/or negative values for Ac-228.</p> <p>Narrow range and low values noted for Bi-214 in the FSS-SYS (conc ranges from approximately 0.3 - 0.45 pCi/g). The box plots do not provide the uncertainty values associated with any of the results so it is not clear how accurate these results are at such low concentrations.</p> <p>K-40 results were fairly consistent between survey types, but all surveys had highly variable (large range of vlaues between approximately 1 or 2 pCi/g - 30 pCi/g) in all surveys.</p>
TU085	2	DG,DK,KB	<p>Box Plots show concern, K-40,B-214 FSS are from different populations. Box plot Ac-228. RAS appeared to show greater variability and activity than the other sets. The biased samples appear to represent a less diverse and lower activity population compared to the others. The biased samples should have been collected at the hot spots. Bi-214 shows similar. Same for K-40 . Ac-228, Bi-214</p>
TU087	2	KB	<p>Only one set of SYS samples collected. No bias samples. Unusually small variability for Bi-214 is suspicious.</p>
TU088	2	KB, DG	<p>SYS-1 has more variability than any of the other data sets. FSS-Bias slightly less variable than FSS-SYS. FSS-SYS has less variability and a lower mean than the other data sets.</p>
TU089	1	KB, DG	<p>Only one set of SYS samples collected. No bias samples because no gamma scan exceedences.</p>

All three surveys for K-40 had similar distributions, with a large range of values	2
Q-Q plots - slope breaks show sometimes flatter, sometimes steeper, could mean different populations	8 with 10 rounds of sampling
Slope break on all 3 - indicates two populations.	1
Slope break on all 3 - indicates two populations.	4
Slope break on all 3 - indicates two populations.	1

The FSS results demonstrate high variability in K-40 results but low variability in Ac-228 and Bi-214.

Pb-214 noted to have two populations

Data Eval Form states Static and Scan data (2,000 - 5,000 cpm) are inconsistent.  
Static data range not provided.

Data Eval Form states Static data are potentially falsified but no evidence regarding sampling falsification is available.

Static scan date and time not provided in SUPR

Scanning was performed after FSS samples collected.

Navy indicates scans and statics are consistent

None noted. Gamma and statics noted to be consistent, but no elevated spots found in gamma scan. Unclear if this means that highs could have been deleted. No bias samples collected.

None noted. Gamma and statics noted to be consistent.

None noted. Gamma and statics noted to be consistent.

On-site lab reported higher values than off-site lab, including one result for K-40	Large range of values are reported for all survey types for K-40, which appears to indicate more than one population of soil type may be represented in the data.	0	
3 samples have values that differ by more than 10x: Form states, "For sample 70-PDT-085-30 values differing by more than 10X: Am-241 (0.05 pCi/g vs -0.47951 pCi/g), Cs-137 (-0.031 vs 0.057843 pCi/g), Eu-154 (-0.04 vs -0.00499 pCi/g), For sample 70 PDT 085-31 values differing by more than 10X: Am-241 (0.002 vs 0.024914), Cs 137 (-0.002 vs 0.076543). For sample 70-PDT-085-33 values differing by more than 10X: Eu-154 (0.004 vs 0.084744 pCi/g)."	Form notes, "Some Characterization samples display different characteristics from other bias, characterization, and final systematic samples."	0	
Two samples vary by more than 10x: Form states, "For sample 70-PDT-087-10 values differing by more than 10X: TI-208 (0.022043 vs 0.344), U-235 (-0.99377 vs 0.08). For sample 70-PDT-087-11 values differing by more than 10X: Am-241 ( 0.03806 vs 0.001), Cs-137 (0.049789 vs -0.0006), Eu-154 (0.11423 vs 0), and Pa 234m (0.16956 vs -0.007)."	1 Ac-228 result below 0	1	R Roberson
	1 Ac-228 result below 0	1	A Jahr
	2 Ac-228 results below 0	0	

M Snyder	1	<p>The FSS results demonstrate high variability in K-40 results but low variability in Ac-228 and Bi-214.</p> <p>Pb-214 (daughter of Ra-226) noted to have two populations</p> <p>Data Eval Form states Static and Scan data (2,000 - 5,000 cpm) are inconsistent. Static data range not provided.</p> <p>Data Eval Form states Static data are potentially falsified but no evidence regarding sampling falsification is available.</p> <p>Static scan date and time not provided in SUPR</p> <p>Scanning was performed after FSS samples collected.</p>	1
P DeLong	1	<p>Mean and variability of bias samples less than FSS_SYS and characterization samples. Appear to represent a different population. Multiple rounds of excavation. On- and off-site samples differ by more than 10x.</p>	0
	1	<p>10x difference between on- and off-site lab in 2 samples. Unusually small variability in Bi-214 data set.</p>	1
	0		0
P Vigil	0		1

Scan data collected after  
FSS sample collection.

No bias samples  
collected. Gamma scan  
conducted after FSS  
samples were collected.

No bias samples  
collected.

1 - Sanitary sewer is associated with Bldg 401. Data Eval Form states that Bldg 401 was not identified in the HRA but that after it was leased, sealed radiological sources (dials and gauges) were stored in the building. Data Eval Form also states no contamination was identified on surfaces or drains, therefore there is no reasonable potential that Bldg 401 activities contaminated the sewer system. Note: Based on revelations about building scan falsification issues, the reviewer questions how thorough or accurate surveys done on surfaces or drains in this building were.

2 - Adjacent TUs include 076, 123, and 124.

3 - Static and scan data are inconsistent; static results were not provided but scan data ranged from 2,000 - 5,000 cpm. Even number cpm values is suspect.

4 - Scan data collected after FSS. This is suspect for falsification of Scan and Static measurement data.

Recommend re-sample.

Recommend resampling to confirm ROC concentrations for several reasons - inconsistent off-site lab results, mean and variability of bias samples inconsistent with FSS\_SYS samples that appear to be a different population, evidence for multiple populations on Q-Q plots, 8 rounds of excavation.

This could be a data set where the scans were manipulated to remove highs, and then the FSS samples were biased to areas with low gamma scan result, but the form indicates that the gamma scan was performed after the FSS samples were collected. 7 manholes removed from this TU. Elevated gamma survey results were identified for Manholes MH340 and MH342, which were disposed as LLRW. Falsification identified in adjacent TU0086.  
Concern only moderate - could be real data.

Lower variability in FSS-SYS and FSS-Bias may indicate successful remediation or could indicate potential falsification (narrow range unusual). Low-to moderate concern. May be candidate for Tier 2 resampling. K-40: 1 event (3/4/08 RAS) has less variability than other 8 events.

1 event. Otherwise no concerns

Is Bldg. 401 going to receive additional investigation?  Static data range needs to be added to this Data Eval Form for TU083	0		4.9	
	0		6.9 ??	
	0			
	0		5.5	
	0			



TU091	2	KB, DG	K-40 and Ac-228 FSS_Bias appear to be different population - lower mean, less variability for Ac-228, less variability for Ac-228. For Bi-214, FSS-SYS and FSS_Bias are about the same and less variable than FSS_1.
TU092	2	KB, DG	Bi-214 appears to have unusually low variability.
TU093	2	KB, DG	Ac-228 and Bi-214 FSS_SYS and FSS_Bias have less variability than the SYS_1 samples Negative Cesium values beginning in 5/30/2008
TU096	2	KB, DG	Only one data set - FSS_SYS. Bi-214 samples have low variability and all results within a low range. No bias samples collected.

Appear to be slope breaks on Ac-228 and Bi-214 plots	3
Bi-214 has unusually small range for FSS samples compared to characterization samples.	3
Appear to be slope breaks on Ac-228 and K-40 plots, probably 2 populations.	1

None noted. Gamma and statics noted to be consistent.

None noted. Gamma and statics noted to be consistent.

Form states, "Gamma scan dataset consistent with FSS sample dataset but inconsistent with static data. No date or time recorded for static survey in SUPR. Static measurements were inconsistent with scan data (slightly larger than the scan range) but still less than the 3 sigma scan level."

Form states, "Static survey date and time not provided in SUPR  
Gamma static dataset inconsistent (small variance) with FSS sample dataset and gamma scan dataset. Gamma static measurements do not appear to represent conditions at TU096".

		1	J Cunningham
	2 Ac-228 results below 0	0	
Form states, "The on-site and off-site laboratories reported Ra-226 activity above the MDA/MDL for both samples. As a result, the Ra-226 activities for two samples were compared directly for precision. The results of the comparison showed relative percent differences (RPDs) from 95.12 to [and] 117.38. Because the on-site laboratory reported higher Ra-226 activity than the off-site laboratory and the RPDs were not within 30, as stated in the Sampling and Analysis Plan." None of the FSS samples were sent to the off-site lab, which should have been done.	1 Ac-228 result below 0	0	
consistent	2 Ac-228 results below 0	1	J Cunningham

	0		0
M Snyder	0		0
J Gutierrez	0		1
	1	Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.	1

No date for Statics.
No bias samples collected. No date for statics.

Box plots and Q-Q plots indicate different populations. Less variability in Bi-214 samples may mean success in remediating this SU, but could also mean falsification. Resample due to uncertainty.

Due to identification of Cs-137 in a pipe removed from this TU, 37 biased samples were collected from the bottom of the trench. No exceedances. Low to moderate concern due to unusually low variability for Bi-214. However, this site was a Cs-137 site. Resample due to uncertainty.

One pipe segment had Cs-137 above release criteria, so 23 biased samples were collected along the trench bottom. No contamination found. However, due to the low variability of the Bi-214 data, the lack of an off-site lab sample for the FSS data set, and the scan/static inconsistencies (including no dates for the static survey), this SU should be resampled.

Resample. (no date for statics, statics inconsistent with TU 96; no biased samples; low variability in Bi-214 results.)  
1 event

	0		5.8	
	0		5	
	0			



TU097	2	KB, DG	FSS_SYS has low variability for Ac-228 and Bi-214 compared to characterization and FSS_1. However, K-40 shows the opposite (more variability). FSS_SYS samples appear to be a different population.
TU098	2	DK, KB, DG	K-40 - mean for Final is highest and less variable. Seems odd that FSS would have a different mean from the others. Ac-228 and Bi-214 have similar means, but less variability. for FSS_SYS. No FSS Bias samples collected. Negative CS-137 values; Ac-228 and Bi-214 mean is higher and more variable for 1/13/09 event as compared to others appears to be a different population.
TU099	2	DK, KB, DG	Cs-137 samples show unusually low variability. K-40 outliers. No FSS_Bias samples

<p>Bias sample plots for Ac-228, Bi-214, and K-40 have slope breaks, indicating multiple populations. Form notes, "Samples 9 to 79 show low concentrations of Bi-214 and Ac-228. Samples 9 to 40 were collected on 08/19/2008. Samples 41 to 79 were collected on 08/20/2008. These samples were counted on 08/21/2008, 08/22/2008, and 08/25/2008. These samples were not biased to a specific location, but were distributed along the bottom of the trench to investigate potential leaks from the pipes. These samples do not appear to be representative of conditions at TU097. The small volumes of soil removed to remediate areas of elevated activity would not result in changes to the entire distribution." KB notes one inconsistent reference to TU 096.</p>	7
<p>Slope break on all 3 - indicates two populations.</p>	6
<p>K-40 plots have slope breaks, as do characterization samples for Ac-228 and Bi-214, suggests multiple populations</p>	15

Form notes: "Static survey date and time not provided in SUPR.

Gamma static dataset inconsistent (low variability) with FSS and gamma scan dataset. Gamma static measurements do not appear to represent conditions at TU096. Gamma scan results consistent with FSS dataset and inconsistent with gamma static dataset." and "No measurements above the investigation level were identified during the performance of gamma scans in Trench Unit 97. Seventy-nine investigative samples were collected along the trench bottom at 3-foot intervals because pipe sediment samples identified cesium-137 (Cs-137) activity at 0.17977 to 0.26670 pico Curie per gram (pCi/g) and radium-226 (Ra-226) activity at 1.8063 to 3.4019 pCi/g. Six of the investigative sample results identified Ra-226 activity to be present at 1.8799 to 2.4089 pCi/g."

Form states, "Reported gamma static counts are suspect; ranged within an unusually narrow band between 4,211 and 4,632 gcpm. No reviewer or review date reported. Gamma static counts are not consistent with the reported gamma scan range and FSS dataset. " Also, "Scan range reported as 2,900 to 9,400 gcpm, apparently exceeding the investigation level of 7,048 gcpm without further explanation. This gamma scan range is not consistent with the gamma static counts, but could be consistent with the FSS dataset. "

Form notes: " Static survey date and time not provided in SUPR. Static results reported low variability, inconsistent with gamma scan results and Final Systematic dataset."

7 samples noted to be consistent.	Form notes, "Initial Bias and other bias results display different characteristics from other Bias, Characterization and FSS samples." and for K-40, " Notes: FSS sample 129 had a high result different from other samples." For Ac-228, there were several biased sample results at or below 0.	1	J Cunningham
	Form states about first samples, " The Visual Sample Plan (VSP) was used to generate 18 systematic sample locations (samples 1 to 18) based on a random start point and a triangular grid. Four of the sample results identified radium-226 (Ra-226) activity to be present at 1.7536 to 2.7581 picocuries per gram (pCi/g). Based on this information, 29 additional samples were collected to further characterize the trench. Characterization sampling identified five additional locations where Ra-226 activity was identified to be present above the release criteria, at 1.5349 to 3.7863 pCi/g. "	0	
Form notes only 2 samples, inconclusive	Forms note for Bi-214 and Ac-228: "Third set of characterization data shows a different distribution from other data."	1	D DeLong

	1	Form notes, "Based on the findings of this evaluation, evidence of potential data falsification was found. It is unlikely the Biased Samples 9 to 79 represent actual conditions within TU097." KB notes that the inconsistent static survey data also indicates probable falsification.	1
C Hughes	1	Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.	1
	1	Inconsistent statics, no final bias samples, third set of characterization data has different distribution. 22 sampling events - Results for Ac-228, B-212, and Bi-214 have different variability for the Sys_1 2/2/09 sampling event. Similar to S0119. Cs-137 different for the 11/13/08, 5/13/09, 6/12/09 and 6/18/09 events.	1

No date for Statics.

No sampler name.

No static survey date and  
time, no  
sampler/surveyor name

Resample. (no date for statics, statics inconsistent with TU 97; no biased samples; low variability in Bi-214 results; falsification noted by Navy.) . K-40 FSS different population. Ac-228 and Bi-214 appear to be different populations at different times.

Recommend resample to confirm ROC concentrations (statics inconsistent with gamma scan data set, low variability in Bi-214 results, no biased samples)

Some samples not analyzed within 2 weeks. Cs-137 remediation, Highest Cs-137 concentration recorded in Parcel G, but unusually low Cs-137 variability. Too many rounds of excavation. Inconsistent statics, different data distributions. Resample to confirm ROC concentrations

		<p>LL removed this bc Scott explained on 10/12 call - Form states, "Onsite/offsite data are comparable (well within a factor of 10x)."</p> <p>Not clear what this means.</p>	4	
			11	



TU100	2	KB, DG	Only one data set - FSS_SYS. Bi-214 samples have low variability and all results within a low range. No bias samples collected.
TU101	2	DK, KB, DG	Ac-228 and K-40 FSS_SYS have greater variability than SYS_1 or characterizations sets. Bi-214 characterization samples appear to be different population (lower variability, smaller data range). No FSS_Bias samples. Form notes: "Sample distribution of Final Systematic samples is slightly more variable compared with other sample types of Bias and Characterization. One outlier was identified for Bi-214 and Ac-228."
TU102	2	DK, KB	Ac-228, Bi-214, K-40 FSS_SYS have greater variability than other two data sets, while characterization samples have less variability. Cs-137 characterization data has the most variability. No FSS_Bias. Form notes: "Final Systematic sample distribution more variables compared to Bias and Characterization samples for Ac-228, Bi-214, and K-40."

All 3 plots have slope breaks, suggest more than one population in FSS_SYS.	1
Ac-228, Bi-214, K-40 FSS_SYS have slope break, indicating 2 populations. Unusually low range of results, variability for Cs-137 samples.	2
Ac-228, Bi-214, K-40 FSS_SYS have slope breaks, indicating 2 populations. Unusually low range of results, variability for Cs-137 samples. Form notes: "The graph is more vertical than expected for the Final Systematic Ac-228 samples."	2

Form notes: "No signature and date from site RSO was recorded on this survey. No gamma scan data was available for review to compare with the FSS samples specific dataset static/scan results." Also no signature for static survey.

Form notes: "The scan survey was performed on 07/19/2008 Scan range for 2350-1 Instrument is 2,970 – 6,590 cpm, exceeding the 3-sigma investigation level for 2350-1 instrument (6,161 cpm). No signature and date from site RSO was recorded on this survey. No gamma scan data was available for review to compare with the Final Systematic samples specific dataset static/scan results." For statics, "The highest count was recorded at 5,842 cpm for sample location 029." Unclear, but bias samples should probably have been collected.

Form notes: "The scan survey was performed on 07/11/2008 Scan range for 2350-1 Instrument is 2,310 – 5,960 cpm. The 3 sigma investigation level for 2350-1 Instrument was 6,161 cpm. No signature and date from the site RSO was recorded on this survey. No gamma scan data was available for review to compare with the Final Systematic samples specific dataset static/scan results." FORM for TU101 notes about TU102: "The static data results for TU 102 is inconsistent compared with the adjacent trenches. The lowest static count was reported for TU102 at 2,471 cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highest static count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU102. "

Form says consistent.		1	R Zahensky
Form notes: "Data comparison is relatively close for Ac-228, Bi-214, and K-40."	Form notes: "The data range for K-40 from 4.68 through 14.96 pCi/g."	1	R Zahensky
Form notes: "Data comparison is relatively close for Ac-228, Bi-214, and K-40."Data inconsistent with Final Systematic sample (046) for the K-40 results. Onsite result was 20.29 pCi/g while the offsite result was 8.2 pCi/g."	Form notes: "The data range for K-40 from 5.06 through 20.22 pCi/g."	TU102	1

			1
	1	No gamma scan data available. Should have been in SUPR.	1
R Zahensky		Unusually low variability for Cs-137. Missing bias samples. Possibly inconsistent statics. Missing gamma scans.	1

No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.

No Site RSO signature, no FSS\_Bias. Gamma scan data suggest statics should have been collected.

No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.

No biased samples. Missing signature and lack of gamma scan data is troubling. Low variability in B-214 data. Only 1 sampling event FSS-SYS. Need to resample.

Should resample due to uncertainty - lack of gamma scan data, no FSS\_Bias samples, different populations in data sets.

Cs-137 remediation, but low Cs-137 variability. K-40 may be from diff pop, inconsistent off-site data, missing bias samples, no gamma scan data. Resample to confirm ROC concentrations

	0		4.7	
	0		6	
See TU101 form, which notes "The static data results for TU 102 is inconsistent compared with the adjacent trenches. The lowest static count was reported for TU102 at 2,471 cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highest static count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU102. " Is this relevant for TU101 or 102?			7	



TU102	2	DK, KB	Ac-228, Bi-214, K-40 FSS_SYS have greater variability than other two data sets, while characterization samples have less variability. Cs-137 characterization data has the most variability. No FSS_Bias. Form notes: "Final Systematic sample distribution more variables compared to Bias and Characterization samples for Ac-228, Bi-214, and K-40."
TU103	1	DK, DG	
TU104	2	DK, DG	
TU106	1	DK, DG	
TU107	1	DK	

<p>Ac-228, Bi-214, K-40 FSS_SYS have slope breaks, indicating 2 populations. Unusually low range of results, variability for Cs-137 samples.</p> <p>Form notes: "The graph is more vertical than expected for the Final Systematic Ac-228 samples."</p>	2
<p>abnormally narrow range of measurement values.</p>	

Form notes: "The scan survey was performed on 07/11/2008 Scan range for 2350-1 Instrument is 2,310 – 5,960 cpm. The 3 sigma investigation level for 2350-1 Instrument was 6,161 cpm. No signature and date from the site RSO was recorded on this survey. No gamma scan data was available for review to compare with the Final Systematic samples specific dataset static/scan results." FORM for TU101 notes about TU102: "The static data results for TU 102 is inconsistent compared with the adjacent trenches. The lowest static count was reported for TU102 at 2,471 cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highest static count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU102. "

Scan data elevated compared to sample data/several samples may have been substituted, Gamma Scan Survey performed on 05/28/2009 at 13:40 on the same day as Final

Systematic Sample collection.

Gamma scan dataset inconsistent with static data. Scan Data range 2,910 – 8,510 cpm, exceeding the investigation level of 7,048 cpm. Static data range 3,100 – 3,400 cpm.

Gamma Scan Survey performed on 05/28/2009 at 13:40 on the same day as Final Systematic Sample collection.

Scan survey performed on 09/30/2008 at 07:40 prior to FSS sample collection. Gamma static dataset inconsistent with scan data and FSS sample dataset. Static range from 3,900 – 4,300 cpm with a STDEV of 136 cpm. Scan data has a range of 1,170 – 8,170 cpm exceeding the investigation level of 4,078 cpm.

Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (standard deviation of the static measurements is too small at 97 cpm) with scan data and Final Systematic sample dataset. Scan survey performed on 04/22/2009 at 08:00 prior to Final Systematic sample collection. Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.

Scan survey performed on 10/14/2008 at 08:15 prior to Final Systematic sample collection. Gamma scan contained measurements greater than the 3-sigma threshold. No date or time recorded for static survey in SUPR. Gamma static dataset consistent with scan data and Final Systematic sample dataset

Form notes: "Data comparison is relatively close for Ac-228, Bi-214, and K-40."Data inconsistent with Final Systematic sample (046) for the K-40 results. Onsite result was 20.29 pCi/g while the offsite result was 8.2 pCi/g."	Form notes: "The data range for K-40 from 5.06 through 20.22 pCi/g."	1	R Zahensky
		0	
		0	
		0	
		0	

	1	Unusually low variability for Cs-137. Missing bias samples. Possibly inconsistent statics. Missing gamma scans.	1
C Hughes	1	1) Sampler Namer Not provided in SUPR. 2) Biased samples have low activity concentration when compared with the FSS samples	
C Hughes	1	1) Sampler Namer Not provided in SUPR. 2) No Bias Samples collected when warranted by Scan measurements, samples may have been collected somewhere else within the trench	1
C Hughes	1	1) Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (standard deviation of the static measurements is too small at 97 cpm) with scan data and Final Systematic sample dataset.. 2) Scan survey performed on 04/22/2009 at 08:00 prior to Final Systematic sample collection. Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.	0
C Hughes	1	Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.	0

No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.
yes, No BIAS Samples collected based on scan data

Cs-137 remediation, K-40 may be from different pop, Recommend Resample to confirm ROC concentrations

Biased Samples may have been collected somewhere else within the trench or elsewhere, Resample to confirm ROC concentrations,

No Bias samples collected when warranted based on Scan Survey. Resample to confirm ROC concentrations.  
1 event

Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations

Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations

See TU101 form, which notes "The static data results for TU 102 is inconsistent compared with the adjacent trenches. The lowest static count was reported for TU102 at 2,471 cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highest static count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU102. " Is this relevant for TU101 or 102?			7	
	0		14	
	0			
	0			
			9	



TU108	2	DK, DG	Cs-137 has more variability and different mean for the 5/30/08 event compared to the 5 events
TU111	2	DK, DG	
TU115	2	KB, DK, DG	Bi-214 and Ac-228 indicate multiple populations by date
TU116	2	DK, DG	K-40, Ac-228, Bi-214 population on 4/15/09 appears different from the other 5 events
TU117	2	DK, DG	
TU118	1	DK, DG	
TU119	1	DK, DG	
TU121	2	DK, DG	

<p>Different slope in line on final. One way falsification caught in 2012 was K-40 for FSSR not the same as original.</p> <p>Slope for Ac-228 looks like 2 different populations in biased samples.</p>	

<p>Scan survey performed on 05/06/2009 at 13:50 after the commencement of Final Systematic sampling. Scan range is 2,390 – 7,900 cpm, exceeding the 3 sigma investigation level of 7,048 cpm.</p>
<p>Scan measurements above investigation threshold inconsistent w/ FSS samples, samples could have been taken in areas with lower count rate in trench. DK - 115 looks ok to me.?</p>
<p>Scan survey performed on 04/27/2009 at 08:45 prior to the commencement of Final Systematic sampling. Some scan measurements exceeded the scan threshold.</p>
<p>Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.</p>
<p>1) Static survey date and time not provided in SUPR. Static results reported low variability inconsistent with gamma scan results and lab data. 2) Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.</p>
<p>Gamma static counts ranged within a narrow band between 3,984 gcpm and 4,747 gcpm and are not consistent with the gamma scan range or FSS dataset. Performed by a suspect worker; no reviewer or review data reported. Performed on 01/24/2009 at 09:40h by a suspect worker. Scan range listed as 3,300 – 7,700 gcpm, apparently exceeding the IL of 7,048 gcpm without further explanation. This gamma scan range is not consistent with the range of gamma static counts described above, but is consistent with the FSS dataset.</p>

		0	
		1	J Cunningham
		1	B Evans
		0	
		1	J Cunningham
		0	
		1	J Cunningham
		1	J Cunningham

C Hughes	1	Scan survey performed on 05/06/2009 at 13:50 after the commencement of Final Systematic sampling. Scan range is 2,390 – 7,900 cpm, exceeding the 3 sigma investigation level of 7,048 cpm. No Bias Samples were collected	1
	1	K-40 Final sample set appears different from earlier. Ac-228 shows 2 different populations, scan measurements higher earlier inconsistent with final sample results	
C Hughes	1	Scan survey performed on 04/27/2009 at 08:45 prior to the commencement of Final Systematic sampling. Some scan measurements exceeded the scan threshold. K-40, Ac-228, Bi-214 population on 4/15/09 appears different from the other 5 events	0
	1	Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.	
C Hughes	0	1) Static survey date and time not provided in SUPR. Static results reported low variability inconsistent with gamma scan results and lab data. 2) Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.	
		Bi-214 have different variability for the Sys_1 2/2/09 sampling event.	1
	1	Some of the samples collected appear to be from a different population	1

yes, No BIAS Samples  
collected based on scan  
data

yes, No BIAS Samples  
collected based on scan  
data for FSS

No Bias Samples were collect when warrented as part of FSS. Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations. Cs-137 varies significantly during the 5/30/08 event due to negative activity levels for this event. Why negative measurements? Operator?

Cs-137 remediation, work performed by suspect worker, only 1 sampling event

Close to impacted area, had a lot of remediation, Difficult to excavate more. Suspect worker Identified

Biased samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations

Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations. Only 1 sampling event - FSS-SYS

Only 1 sampling event - FSS-SYS

Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations

Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations

Cs-137 varies significantly during the 5/30/08 event due to negative activity levels for this event. Why negative measurements? Operator?	0			
	0		2	
	1	Donna recommended for PCA	1	
	0			
	0	Dave left overall score blank, so I just filled in 1		
		May not be enough to justify resampling. Any other flags?		
	0			



TU124	2	DK, DG	
TU151	1	DG, DK	Box Plots show concern
TU204	2	DK, DG	Box Plots indicate Narrow Range, but scan data indicates a larger range

	3
	1

Static survey date and time not provided in SUPR.

Gamma static dataset inconsistent with scan data and Final Systematic sample dataset

The static gamma measurements, which were collected before sampling, do not reflect the variability observed in either the range of the scan results or the analytical results. The scan range and sample activity range appear plausible. It should be noted that scan results above the investigation level were apparently never investigated or sampled.

Static range = 3,748 – 4,220 cpm

Scan range = 1,390 – 8,240 cpm (investigation level = 7,048 cpm)

Sample activity range (K-40) = 3.5 – 13.5 pCi/g Scan range = 1,390 – 8,240 cpm (investigation level = 7,048 cpm) Scan survey performed on 07/06/2012 at 10:00 prior to Final Systematic sample collection.

Gamma scan dataset inconsistent with static data and/or Final Systematic sample dataset.

Performed by a suspect worker; no reviewer or review data reported.

The scan survey was performed on 06/15/2011. Scan range for 2350-1 Instrument is 4,000 to 7,610 cpm. The 3 sigma investigation level for 2350-1 Instrument was 8,014 cpm. No signature and date from the site RSO was recorded on this survey.

No raw scan data was provided in the SUPR.

	FSS samples appear to be from a different population	1	D DeLong
		1	J Cunningham
		1	J Cunningham

	1	<p>1)Gamma scan dataset inconsistent with static data and/or Final Systematic sample dataset. Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations</p>	
		<p>samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations</p>	

yes, No BIAS Samples collected based on scan data for FSS

Suspect Worker, FSS Samples appear to be from a different population of samples. Samples may have been collected somewhere else , Resample to confirm ROC concentrations

6 RAS events followed by 2 FSS events. Variability for Ac-228 and Bi-214 for the final 2 FSS events (6/22/09 and 7/6/09) is smaller than the RAS events (1/29/09 thru 6/11/09) and activity levels drop below clean-up levels over the 11 day period between RAS and FSS.

Suspect Worker, samples may have been collected somewhere else, only 1 sampling event? Resample to confirm ROC concentrations

Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations

		Not sure		
	1	Confirming Dave wants PCA?	8	
	1	Confirming Dave wants PCA? Or already so obvious we don't need it?		



# Summary of EPA review of Parcel G Trench

Number of TU's	% of Parcel G total
63	100%
<i>Navy reviewed 63 total Trench Units to loo</i>	
20	32%
0	0%
43	68%
<i>EPA reviewed the 43 Trench Units recommi</i>	
0	0%
11	17%
32	51%
<i>Total Navy and EPA recommend for resamp</i>	
52	83%

Trench Unit	EPA score
TU067	1
TU068	1
TU078	1
TU079	1
TU089	1
TU103	1
TU106	1
TU107	1
TU118	1
TU119	1
TU151	1
TU069	2
TU071	2
TU072	2
TU073	2
TU074	2
TU075	2
TU076	2
TU080	2
TU082	2
TU083	2
TU085	2
TU087	2
TU088	2
TU091	2
TU092	2
TU093	2
TU096	2
TU097	2

# 1 Units Draft 10-13-2017

Total trench units in Parcel G
<i>k for signs of potential falsification</i>
Navy recommended confirmation sampling due to signs of potential falsification
Navy recommended reanalysis of archived samples
Navy recommended NFA = No further action due to signs of falsification, but potential further action due to uncertainty
<i>ended for NFA</i>
EPA score 0 = No specific findings of particular concern
EPA Score 1 = Need further review
EPA Score 2 = Need resampling before determination that the record supports ROD requirements met
<i>oling</i>

**83% of total TU's now recommended for resampling and 17% need further evaluation**

Note: TU 66 and TU 70 the Navy recommended for partial re-sampling only. However, both are marked for full resampling due to suspect soil from the fill unit that was used to fill those TUs.

TU098	2
TU099	2
TU100	2
TU101	2
TU102	2
TU102	2
TU104	2
TU108	2
TU111	2
TU115	2
TU116	2
TU117	2
TU121	2
TU124	2
TU204	2



Trench Unit	Overall score (0,1, or 2)	Reviewer	Recommend for PCA (1 or 0)
TU067	1	JD, DG	0
TU068	1	JD, DG	0
TU078	1	JD, DG	0
TU079	1	JD, DG	0
TU089	1	KB, DG	0
TU103	1	DK, DG	0
TU106	1	DK, DG	0
TU107	1	DK	
TU118	1	DK, DG	0
TU119	1	DK, DG	
TU151	1	DG, DK	1
TU101	2	DK, KB, DG	0
TU069	2	JD, DG	0
TU071	2	DG, DK; JD	0
TU072	2	DK; KB; JD	
TU073	2	DK; JD	
TU074	2	JD	
TU075	2	JD, DG	0
TU076	2	JD	0
TU080	2	JD, DG	0
TU082	2	JD, DG	0
TU083	2	JD, DG	0
TU085	2	DG,DK,KB	0
TU087	2	KB	0
TU088	2	KB, DG	0
TU091	2	KB, DG	0
TU092	2	KB, DG	
TU093	2	KB, DG	0
TU096	2	KB, DG	0
TU097	2	KB. DG	
TU098	2	DK, KB, DG	
TU099	2	DK, KB, DG	
TU100	2	KB, DG	0
TU102	2	DK, KB	
TU102	2	DK, KB	
TU104	2	DK, DG	0
TU108	2	DK, DG	0
TU111	2	DK, DG	0

Grey area - talk to group	Scoring ranking	
yes	4.5	
Yes, Note 2007 is before allegations re soil falsification began	5.4	
	5	
	Not available	
	14	
	9	
Dave left overall score blank, so I just filled in 1		
May not be enough to justify resampling. Any other flags?		
Confirming Dave wants PCA?	8	
	6	
	5.4	
	8.2	
	7.2	10
Review with group	6.6	13
	Not available	
	5.8	
	Not available	
	Not available	
Yes		
	4.9	
	6.9 ??	
	5.5	
	5.8	
	5	
LL removed this bc Scott explained on 10/12 call - Form states, " Onsite/offsite data are comparable (well within a factor of 10x). " Not clear what this means.	4	
	11	
	4.7	
	7	
	7	
	2	

TU115	2	KB, DK, DG	1
TU116	2	DK, DG	
TU117	2	DK, DG	0
TU121	2	DK, DG	0
TU124	2	DK, DG	
TU204	2	DK, DG	1

Donna recommended for PCA	1	
Not sure		
Confirming Dave wants PCA? Or already so obvious we don't need it?		



Trench Unit	Overall score (0,1, or 2)	Reviewer	Box Plots
TU067	1	JD, DG	<p>RAS results for all rads do not have any variability and are from a different population than all other surveys/samples so they look suspicious.</p> <p>K-40 FSS results very low variability, low concentrations, and indicate a different population</p>
TU068	1	JD, DG	<p>FSS results have very low variability compared to other surveys, especially for K-40, DG K-40 variability changes bewtween sampling events</p>

Q-Q Plots	Rounds of excavation
K-40 in FSS possibly from a different popultaion	3
K-40 in FSS possibly from a different popultaion	3

Gamma scan or static concerns

1 - Sampler name, off-site sample mass and COC forms for samples missing from reports.

2 -Static survey not signed by RSO in SUPR

3 - Raw scan data not in SUPR

4 - Scan and static data do not appear to be consistent: scan data highest result was 4,843 cpm; static data ranged from 2,530-6,240 cpm

Scan data appears to fall within the expected variability (2,608 - 7,560 cpm)

1 - Sampler name, off-site sample mass and COC forms for samples missing from reports.

2 -Static survey not signed by RSO in SUPR

3 - Raw scan data not in SUPR

Scan data appears to fall within the expected variability (2,608 - 7,560 cpm)

On vs offsite lab	Time Series	Suspect name (1=yes, 0=no)
According to Data Eval Plan, the on-site vs off-site data are consistent		1
According to Data Eval Plan, the on-site vs off-site data are consistent		0

Name, if suspect	Name, if not suspect	Signs of falsifying (1=Yes, 0=no)
R Roberson		1
	P Vigil	1

Signs of falsification summary	Failure to follow workplan (1=Y, 0=N)
<p>1 -RAS results look suspicious due to very low variability</p> <p>2 - Review form indicates allegations associated with this TU: Former Worker Allegation: RSY-2 laborers missing the required number of samples. Taylor told them to go get a sample "from anywhere." They went behind the Conex to another pad and got an unrelated "false" sample. Allen and Reggie</p> <p>3 - missing COCs and raw scan data in reports</p>	
<p>1 -RAS results look faked due to very low variability</p> <p>2 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports</p> <p>3 - Multiple excavations, adjacent to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2</p> <p>4- Population of K-40 on is much more variable on 9/19/07 than the remaining 10 events. From 9/19/07 to 9/20/07 variability drops.</p>	

Signs of failure to follow  
workplan

Missing data and info in  
SUPRs

Comments - Other

This survey unit is suspect for the following reasons:

- 1 - Former worker allegations regarding screening of soil from this trench unit at the RSY2. This indicates a high potential that FSS results could also have been falsified
- 2 - RAS results do not have normal variability - suspect for falsification
- 3 - K-40 FSS results look like they are from a different popultaion than other surveys
- 4 - COCs and names of samplers missing in SUPR
- 5 - No RSO signatures on survey results
- 6 - Raw scan data missing from SUPR

Recommend for re-sampling

This survey unit is suspect for the following reasons:

- 1 - Variability in sample results for FSS low - suspect for falsification
- 2 - K-40 FSS results look like they are from a different population than other surveys
- 3 - COCs and names of samplers missing in SUPR
- 4 - No RSO signatures on survey results
- 5 - Raw scan data missing from SUPR

Recommend for re-sampling



Followup needed, e.g. questions for Navy	Recommend for PCA (1 or 0)	Grey area - talk to group	Scoring ranking	
	0	yes	4.5	
	0	Yes, Note 2007 is before allegations re soil falsification began	5.4	

TU069	2	JD, DG	<p>RAS results for all radionuclides have low variability and for Ac-228 and Bi-214, indicate RAS results are from a different population than all other surveys/samples.</p> <p>K-40 FSS results have very low variability, low concentrations, and indicate there are different populations among the surveys, DG K-40 variability changes between sampling events</p>
TU071	2	DG, DK; JD	<p>RAS samples show different population for Bi-214</p> <p>K-40 FSS-Bias have a large variability indicating either heterogeneous soil or potentially different soil populations</p>
TU072	2	DK; KB; JD	No anomalies noted
TU073	2	DK; JD	No anomalies noted

K-40 in FSS from a different popultaion	3
<p>RAS K-40 results look different than other two surveys, however only two RAS samples were collected.</p> <p>K-40 FSS-Bias has a wider range of values.</p>	1
No anomalies	3
No anomalies noted, K-40 slope slightly different in SYS_1 but this is due to one or more low results in this set of data.	3

1 - Sampler name, off-site sample mass and COC forms for samples missing from reports.

2 -Static survey not signed by RSO in SUPR

3 - Raw scan data not in SUPR

4 - Scan and static data inconsistent: highest count for statics was 4,676 cpm; scan data ranged from 3,220 - 6,200 cpm

Gamma static survey data highest count was 6,165 cpm; scan survey data ranged from 4,000 - 7,500 cpm.

No range was provided for the Static survey data.

No signature and date from RSO recorded on the Static Data

Scan survey data not available for review, and no signature or date is recorded from the RSO.

The Data Eval Form states the static data (highest count was 4,279 cpm) are inconsistent with the scan results (3,890-6,720 cpm)

COCs not provided in SUPR

Scan data (highest count was 4,673 cpm) and Static data (4,240 - 8,750) are not consistent.

RSO signature and date missing from survey data, sampler not identified in SUPR

According to Data Eval Plan, the on-site vs off-site data are consistent	Sys-1 and FSS-Bias results for K-40 are from a different population than the RAS of FSS. This indicates there may be different populations of soils/samples represented between the different surveys.	1
According to Data Eval Plan, the on-site vs off-site data are consistent	Cs-137 results were mostly non-detect or negative. Cs-137 results should not be mostly negative. This indicates a potential data quality issue.	0
According to Data Eval Plan, the on-site vs off-site data are consistent	No trends identified	1
According to Data Eval Plan, the on-site vs off-site data are consistent	No trends identified.	0

A Jahr		1
	P Vigil	1
R Roberson		1
	P Vigil	1

<p>1 -RAS results for all radionuclides have low variability.</p> <p>2 - Ac-228 and Bi-214 RAS results are from a different population than all other surveys/samples</p> <p>3 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports</p> <p>4 - Multiple excavations, near to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2, DG K-40 more variable on 9/19/07 and 10/17/07 than other sampling events.</p> <p>5 - Worker involved in allegations included in sample team</p> <p>6 - K-40 more variable on 9/19/07 and 10/17/07 than other sampling events.</p>	1
<p>1 - Scan survey data not available for review</p> <p>2 - Static data range not provided in Data Eval Form.</p> <p>3 - No RSO signature and date provided for static or scan data</p>	1
<p>1 - Inconsistent scan and static data; highest count for static survey was 4,279 cpm where scans ranged from 3,890 - 6,720 cpm2 - SUPR missing COCs</p> <p>2 - Worker involved in allegations included in sample team</p>	1
<p>1 - Scan and Static data inconsistency; narrow range of static data values which is not consistent with environmental monitoring.</p> <p>2 - RSO signature on scan and static data results is missing</p> <p>3 - Suspect worker involved with data collection</p>	0

<p>SUPRs missing COCs, RSO signatures and dates, and scan data</p>
<p>1 - RSO signature missing on static and scan data</p> <p>2 - Section 4 of Data Eval Form states "No gamma scan data was available for review to compare with the FSS samples specific dataset static/scan results."</p>
<p>COCs not provided in SUPR as documentary evidence of sample integrity, date and time of collection and arrival at laboratory.</p>



This survey unit is suspect for the following reasons:

1 - RAS results do not have normal variability and are from different population than other surveys for Ac-228 and Bi-214 - suspect for falsification

2 - K-40 FSS results look like they are from a different population than other surveys

3 - COCs and names of samplers missing in SUPR

4 - No RSO signatures on survey results

5 - Raw scan data missing from SUPR

6 - Worker involved in allegations performed work at this TU

Recommend for re-sampling

1 - Remediation was performed due to Cs-137, the time series plots show that most of the characterization results for Cs-137 were at or near zero, or were negative values. This indicates a data quality issue, and thus, un-reliable data.

2 - Gamma scan data missing, and no RSO signature and date on static and scan data.

Recommend resample to confirm ROC concentrations for Ra-226 and Cs-137

1 - Scan and Static data are inconsistent

2 - SUPRs do not contain COCs for samples collected. Without this documentary evidence, the integrity, location, date, time or evidence of who had custody of the samples is missing. Therefore, the data is not defensible and not usable for decision making.

Recommend resample to confirm ROC concentrations

1 - TU is downstream from Building 274 used for decontamination training and offices, Building 322 used by NRDL for development of radiation detection instrumentation (no contamination found and building demolished), and Buildings 313, 313A used by NRDL for Instrumentation laboratory and as stockroom and storage areas.

2 -Cs-137 was found above the action level in 2002; but no evidence of residual radioactivity above the release criteria was found in 2014.

	0		5.4	
<p>Section 4 of Data Eval Form states "No gamma scan data was available for review to compare with the FSS samples specific dataset static/scan results."</p> <p>Need explanation on what this means.</p>	0		8.2	
			7.2	10
		Review with group	6.6	13

TU074	2	JD	No comparisons made - only one set of FSS data collected. Data are highly variable
TU075	2	JD, DG	Each event for each ROC has different variability with varying means. RAS and Bias results are slightly higher when compared to SYS-1 or FSS results for Ac-228 and Bi-214; however the number of RAS and FSS-Bias results is small and the differences in concentration ranges are relatively small..

<p>No comparisons made - only one set of FSS data collected</p>	<p>0</p>
<p>RAS and FSS-Bias K-40 data have a different slope than SYS-1 or FSS data sets, however range of values for RAS and FSS-Bias is only slightly different and number of samples is small</p>	<p>2</p>

1 - Scan and static data are inconsistent. Static results ranged from 4,300 - 5,800 cpm; scan ranged from 1,630 - 6,750 cpm.

2 - Low value in scan data unusual because it is below background.

3 - Small range/low variability in Static results

3 - Scan data performed after FSS sample collection.

Data Eval Form noted that there were negative results for Ra-226, low K-40 concentrations, and two results for Ac-228 at or below 0 pCi/g.

Static and scan data are not consistent. Static results ranged from 4,200 - 6,200 cpm; scan data ranged from 1,370 - 7,720 cpm.

Low values in scan data are unusual because these low values are significantly lower than background.

According to Data Eval Plan, the on-site vs off-site data are consistent	It is noted that extremely low results for Ac-228, Bi-214, and K-40 reported on the same days, indicating a potential problem with the data on these dates. Time series plots dates were not legible	0
According to Data Eval Plan, the on-site vs off-site data are consistent	Ac-228 and Bi-214 RAS and Bias results are from a different population than SYS-1 or FSS results	0

	P Vigil	1
	P Vigil	1

<p>1 - Scan and static data are inconsistent. Static results ranged from 4,300 - 5,800 cpm; scan ranged from 1,630 - 6,750 cpm.</p> <p>2 - Low values in scan data unusual because the low counts per minute are within a range that is below background.</p> <p>3 - Scan data performed after FSS sample collection.</p>	<p>1</p>
<p>Inconsistent static data (4,200 - 6,200 cpm) and scan data (1,370 - 7,720 cpm), scan data includes results below background levels.</p> <p>Suspect worker involved in data collection.</p> <p>Each event for each ROC has different variability with varying means.</p>	<p>1</p>



Scan data collected after FSS sample collection which is a departure from the Work Plan.

Section 4 of the Data Eval Form states that there was no mention of pipe swipe surveys or sediment sampling in manholes. This would indicate a deficiency in the investigation and a departure from the Work Plan.

1 - TU074 was not remediated but is adjacent to TUs 81 and 83 which did have contamination.

2 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shop, and offices, a trades shop, and general store. No contamination is expected to have been released from this building; however, TU075 which was also connected to Bldg. 401 did have contamination.

3 - Scan and Static data are inconsistent, with unusually low results in scan data and in FSS data.

4 - Scan was performed after FSS samples collected.

5 - Sampler not identified in SUPR, person responsible for gamma scans and static measurements is listed on the NRC petition as a suspect worker.

Recommend for re-sample

1 - Data Eval Form noted that there were negative results for Ra-226, low K-40 concentrations, and two results for Ac-228 at or below 0 pCi/g. Reviewer comment: this could indicate poor data quality and/or falsification.

2 - Static and scan data are inconsistent. Static results ranged from 4,200 - 6,200 cpm; scan data ranged from 1,370 - 7,720 cpm: Low values in scan data are unusual because these low values are significantly lower than background.

4 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shop, and offices, a trades shop, and general store. The narrative states that no contamination was found on surfaces or drains in the building, therefore it is not expected that contamination released from this building.

5 - Section 4 of the Data Eval Form discusses the contamination that was found in this TU, despite the purported lack of contamination in Bldg 401. The narrative also states that there was no mention of pipe swipe surveys or sediment sampling in manholes, therefore the investigation did not follow the Work Plan and is deficient. This is important to note because contamination was found in this trench.

6 - Suspect worker involved in static/scan surveys

Recommend re-sampling.

			Not available	
<p>Need to look at data more closely to identify possible reasons for data inconsistencies. For example: Were scan and static data sets approved/signed by RSO? Are COCs present in SUPR? Were any data quality issues mentioned in RACR or SUPR?</p>	0		5.8	

TU076	2	JD	All surveys/sample collection results have low and/or non-detect results for Ac-228
TU078	1	JD, DG	<p>All surveys/sample collection results have low and/or non-detect results for Ac-228 except for FSS-Bias results</p> <p>K-40: mean stays the same but spread up and down varies between events</p> <p>Cs-137: negative measurements appear to be remedied in 3/17 2008, 6 sampling events prior contain many negative activity levels</p>

<p>K-40 results have large range of values/variability, especially in FSS.</p>	<p>4</p>
<p>K-40 FSS has large range of values compared to other survey units.</p>	<p>4 to 5</p>

Static and scan data inconsistent. Static ranged from 4,452 - 4,914; scan data ranged from 3,000 - 7,000 cpm

Static and scan data inconsistent. Static ranged from 3,953 - 4,543; scan data ranged from 3,000 - 7,000 cpm

On-site lab reported higher Bi-214 and Ra-226 values than off-site lab.	All surveys/sample collection results have low and/or non-detect results for Ac-228	1
On-site lab reported higher Bi-214 and Ra-226 values than off-site lab.	All surveys/sample collection results have low and/or non-detect results for Ac-228	0

J Cunningham		1
	S Brown	1



<p>1 -Static and scan data inconsistent. Static ranged from 4,452 - 4,914; scan data ranged from 3,000 - 7,000 cpm. Range for static data is too small indicating static data is falsified.</p> <p>2 - All surveys/sample collection results have unusually low and/or non-detect results for Ac-228. This indicates either poor data quality or falsification.</p> <p>3 - Suspect worker involved with data collection.</p>	<p>1</p>
<p>1 -Static and scan data inconsistent. Static ranged from 3,953 - 4,543; scan data ranged from 3,000 - 7,000 cpm. Range for static data is small.</p> <p>2 - Scan data is reported to be exactly the same as TU076 (3,000 - 7,000 cpm)</p> <p>3 - Unclear whether Scan/Static personnel S. Brown is the same as Emitt Brown from NRC list</p> <p>4 - K-40: mean stays the same but spread up and down varies between events Cs-137: negative measurments appear to be remedied in 3/17 2008, 6 sampling events prior contain many negative activity levels</p>	<p>0</p>

Range of cpm values for static data is too small indicating static data may have been collected at only one or a few locations.

1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings.

2 - Adjacent TUs 078, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results.

3 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification.

4 - Suspect worker involved in data collection.

5 - Probable data quality issues with low Ac-228 results.

Data Eval Form states TU076 is adjacent to Bldg 411. Similarly, TU078 and TU080 are also adjacent to Bldg. 411. Samples collected from all three TUs include several Ac-228 results that are at or below 0, and similarities were observed with samples collected from TU077 which is adjacent to TU076.

Recommend re-sample.

1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings.

2 - Adjacent TUs 076, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results.

3 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification.

4 - It is unclear whether suspect worker was involved in data collection.

Data Eval Form states TU076 is adjacent to Bldg 411. Similarly, TU078 and TU080 are also adjacent to Bldg. 411. Samples collected from all three TUs include several Ac-228 results that are at or below 0, and similarities were observed with samples collected from TU077 which is adjacent to TU076.

Recommend re-sample.

Need to look at data more closely to identify possible reasons for low or non-detect Sc-228 and data inconsistencies. For example: Were scan and static data sets approved/signed by RSO? Are COCs present in SUPR? Were any data quality issues mentioned in RACR or SUPR?	0		Not available	
	0		5	

TU079	1	JD, DG	Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data
TU080	2	JD, DG	Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data
TU082	2	JD, DG	All survey types had very low concentrations of Ac-228, or concentrations at 0; RAS results for Ac-228 also had negative values FSS-BIAS spread different for K-40 then other events however mean is similar. Cs-137 affected by negative values.

<p>Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data</p>	0
<p>Only FSS data collected, no remediation conducted. Large range of values/variability for all rads in FSS data</p>	0
<p>No anomalies in trends observed; however Ac-228 results were low, with some reported as 0 or negative (RAS).</p>	2

Static and scan data inconsistent. Static ranged from 5,326 - 5,943; scan data ranged from 3,430 - 6,790 cpm

Static and scan data inconsistent. Static ranged from 6,089 - 7,126 cpm; Scan ranged from 4,250 - 6,500 cpm

RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification.

Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).

According to Data Eval Plan, the on-site vs off-site data are consistent	Variable data, large range of values	0
On-site lab reported higher Bi-214 and Ra-226 values than off-site lab.	Variable data, large range of values	1
Data Eval Form states data were consistent	No anomalies in trends observed; however Ac-228 results were low, with some reported as 0 or negative (RAS).	1



	P Vigil	1
R Zahensky		1
J Cunningham		1

<p>Static data (5,326 - 5,943 cpm) and Scan data (3,430 - 6,790 cpm) are not consistent, static data has very narrow range of values compared to what would be expected for environmental conditions.</p>	
<p>Static and scan data inconsistent. Static ranged from 6,089 - 7,126 cpm; Scan ranged from 4,250 - 6,500 cpm</p>	0
<p>1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification.</p> <p>2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).</p>	0


1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079.

2 - Adjacent TUs 076, 078, and TU108; and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0.

3 - Static and scan data are inconsistent; static results ranged from 5,326 - 5,943 cpm and scan data ranged from 3,430 - 6,790 cpm.

4 - Suspect worker involved in data collection.

5 - Probable data quality issues with Ac-228 results.

6 - 1 sampling event

1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079.

2 - Adjacent TUs 076, and TU087 (also adjacent to Bldg. 411); and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0.

3 - Static and scan data are inconsistent; static results ranged from 6,089 - 7,126 cpm and scan data ranged from 4,250 - 6,500 cpm.

4 - Suspect worker involved in data collection.

5 - Probable data quality issues with Ac-228

6 - 1 sampling event

1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification.

2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).

3 - Suspect worker involved with data collection.

4 - TU082 is adjacent to TUs 077, 080, 081 which all included several Ac-228 results at or below 0. Data Eval Form indicates Bi-212 and Pb-212 in the Th-232 decay series were consistent with other sample results in TU082. This may indicate a data quality issue with the analysis and reporting of Ac-228.

Recommend for re-sampling

Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079.	0		Not available	
Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in this building. HRA info is needed to evaluate potential for contamination of sewer lines/TU080.	0		Not available	
	0	Yes		

TU083	2	JD, DG	<p>All surveys resulted in low and/or negative values for Ac-228.</p> <p>Narrow range and low values noted for Bi-214 in the FSS-SYS (conc ranges from approximately 0.3 - 0.45 pCi/g). The box plots do not provide the uncertainty values associated with any of the results so it is not clear how accurate these results are at such low concentrations.</p> <p>K-40 results were fairly consistent between survey types, but all surveys had highly variable (large range of values between approximately 1 or 2 pCi/g - 30 pCi/g) in all surveys.</p>
TU085	2	DG,DK,KB	<p>Box Plots show concern, K-40,B-214 FSS are from different populations. Box plot Ac-228. RAS appeared to show greater variability and activity than the other sets. The biased samples appear to represent a less diverse and lower activity population compared to the others. The biased samples should have been collected at the hot spots. Bi-214 shows similar. Same for K-40. Ac-228, Bi-214</p>
TU087	2	KB	<p>Only one set of SYS samples collected. No bias samples. Unusually small variability for Bi-214 is suspicious.</p>
TU088	2	KB, DG	<p>SYS-1 has more variability than any of the other data sets. FSS-Bias slightly less variable than FSS-SYS. FSS-SYS has less variability and a lower mean than the other data sets.</p>
TU089	1	KB, DG	<p>Only one set of SYS samples collected. No bias samples because no gamma scan exceedences.</p>

All three surveys for K-40 had similar distributions, with a large range of values	2
Q-Q plots - slope breaks show sometimes flatter, sometimes steeper, could mean different populations	8 with 10 rounds of sampling
Slope break on all 3 - indicates two populations.	1
Slope break on all 3 - indicates two populations.	4
Slope break on all 3 - indicates two populations.	1

The FSS results demonstrate high variability in K-40 results but low variability in Ac-228 and Bi-214.

Pb-214 noted to have two populations

Data Eval Form states Static and Scan data (2,000 - 5,000 cpm) are inconsistent.  
Static data range not provided.

Data Eval Form states Static data are potentially falsified but no evidence regarding sampling falsification is available.

Static scan date and time not provided in SUPR

Scanning was performed after FSS samples collected.

Navy indicates scans and statics are consistent

None noted. Gamma and statics noted to be consistent, but no elevated spots found in gamma scan. Unclear if this means that highs could have been deleted. No bias samples collected.

None noted. Gamma and statics noted to be consistent.

None noted. Gamma and statics noted to be consistent.



On-site lab reported higher values than off-site lab, including one result for K-40	Large range of values are reported for all survey types for K-40, which appears to indicate more than one population of soil type may be represented in the data.	0
3 samples have values that differ by more than 10x: Form states, "For sample 70-PDT-085-30 values differing by more than 10X: Am-241 (0.05 pCi/g vs -0.47951 pCi/g), Cs-137 (-0.031 vs 0.057843 pCi/g), Eu-154 (-0.04 vs -0.00499 pCi/g), For sample 70 PDT 085-31 values differing by more than 10X: Am-241 (0.002 vs 0.024914), Cs 137 (-0.002 vs 0.076543). For sample 70-PDT-085-33 values differing by more than 10X: Eu-154 (0.004 vs 0.084744 pCi/g)."	Form notes, "Some Characterization samples display different characteristics from other bias, characterization, and final systematic samples."	0
Two samples vary by more than 10x: Form states, "For sample 70-PDT-087-10 values differing by more than 10X: TI-208 (0.022043 vs 0.344), U-235 (-0.99377 vs 0.08). For sample 70-PDT-087-11 values differing by more than 10X: Am-241 ( 0.03806 vs 0.001), Cs-137 (0.049789 vs -0.0006), Eu-154 (0.11423 vs 0), and Pa 234m (0.16956 vs -0.007)."	1 Ac-228 result below 0	1
	1 Ac-228 result below 0	1
	2 Ac-228 results below 0	0

	M Snyder	1
	P DeLong	1
R Roberson		1
A Jahr		0
	P Vigil	0

<p>The FSS results demonstrate high variability in K-40 results but low variability in Ac-228 and Bi-214.</p> <p>Pb-214 (daughter of Ra-226) noted to have two populations</p> <p>Data Eval Form states Static and Scan data (2,000 - 5,000 cpm) are inconsistent. Static data range not provided.</p> <p>Data Eval Form states Static data are potentially falsified but no evidence regarding sampling falsification is available.</p> <p>Static scan date and time not provided in SUPR</p> <p>Scanning was performed after FSS samples collected.</p>	1
<p>Mean and variability of bias samples less than FSS_SYS and characterization samples. Appear to represent a different population. Multiple rounds of excavation. On- and off-site samples differ by more than 10x.</p>	0
<p>10x difference between on- and off-site lab in 2 samples. Unusually small variability in Bi-214 data set.</p>	1
	0
	1

Scan data collected after FSS  
sample collection.

No bias samples collected.  
Gamma scan conducted after  
FSS samples were collected.

No bias samples collected.

1 - Sanitary sewer is associated with Bldg 401. Data Eval Form states that Bldg 401 was not identified in the HRA but that after it was leased, sealed radiological sources (dials and gauges) were stored in the building. Data Eval Form also states no contamination was identified on surfaces or drains, therefore there is no reasonable potential that Bldg 401 activities contaminated the sewer system. Note: Based on revelations about building scan falsification issues, the reviewer questions how thorough or accurate surveys done on surfaces or drains in this building were.

2 - Adjacent TUs include 076, 123, and 124.

3 - Static and scan data are inconsistent; static results were not provided but scan data ranged from 2,000 - 5,000 cpm. Even number cpm values is suspect.

4 - Scan data collected after FSS. This is suspect for falsification of Scan and Static measurement data.

Recommend re-sample.

Recommend resampling to confirm ROC concentrations for several reasons - inconsistent off-site lab results, mean and variability of bias samples inconsistent with FSS\_SYS samples that appear to be a different population, evidence for multiple populations on Q-Q plots, 8 rounds of excavation.

This could be a data set where the scans were manipulated to remove highs, and then the FSS samples were biased to areas with low gamma scan result, but the form indicates that the gamma scan was performed after the FSS samples were collected. 7 manholes removed from this TU. Elevated gamma survey results were identified for Manholes MH340 and MH342, which were disposed as LLRW. Falsification identified in adjacent TU0086.

Concern only moderate - could be real data.

Lower variability in FSS-SYS and FSS-Bias may indicate successful remediation or could indicate potential falsification (narrow range unusual). Low-to moderate concern. May be candidate for Tier 2 resampling. K-40: 1 event (3/4/08 RAS) has less variability than other 8 events.

1 event. Otherwise no concerns

<p>Is Bldg. 401 going to receive additional investigation?</p> <p>Static data range needs to be added to this Data Eval Form for TU083</p>	0		4.9	
	0		6.9 ??	
	0			
	0		5.5	
	0			

TU091	2	KB, DG	K-40 and Ac-228 FSS_Bias appear to be different population - lower mean, less variability for Ac-228, less variability for Ac-228. For Bi-214, FSS-SYS and FSS_Bias are about the same and less variable than FSS_1.
TU092	2	KB, DG	Bi-214 appears to have unusually low variability.
TU093	2	KB, DG	Ac-228 and Bi-214 FSS_SYS and FSS_Bias have less variability than the SYS_1 samples Negative Cesium values beginning in 5/30/2008
TU096	2	KB, DG	Only one data set - FSS_SYS. Bi-214 samples have low variability and all results within a low range. No bias samples collected.

Appear to be slope breaks on Ac-228 and Bi-214 plots	3
Bi-214 has unusually small range for FSS samples compared to characterization samples.	3
Appear to be slope breaks on Ac-228 and K-40 plots, probably 2 populations.	1



None noted. Gamma and statics noted to be consistent.

None noted. Gamma and statics noted to be consistent.

Form states, "Gamma scan dataset consistent with FSS sample dataset but inconsistent with static data. No date or time recorded for static survey in SUPR. Static measurements were inconsistent with scan data (slightly larger than the scan range) but still less than the 3 sigma scan level."

Form states, "Static survey date and time not provided in SUPR  
Gamma static dataset inconsistent (small variance) with FSS sample dataset and gamma scan dataset. Gamma static measurements do not appear to represent conditions at TU096".

		1
	2 Ac-228 results below 0	0
Form states, "The on-site and off-site laboratories reported Ra-226 activity above the MDA/MDL for both samples. As a result, the Ra-226 activities for two samples were compared directly for precision. The results of the comparison showed relative percent differences (RPDs) from 95.12 to [and] 117.38. Because the on-site laboratory reported higher Ra-226 activity than the off-site laboratory and the RPDs were not within 30, as stated in the Sampling and Analysis Plan." None of the FSS samples were sent to the off-site lab, which should have been done.	1 Ac-228 result below 0	0
consistent	2 Ac-228 results below 0	1

J Cunningham		0
	M Snyder	0
	J Gutierrez	0
J Cunningham		1

	0
	0
	1
Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.	1

No date for Statics.
No bias samples collected. No date for statics.

Box plots and Q-Q plots indicate different populations. Less variability in Bi-214 samples may mean success in remediating this SU, but could also mean falsification. Resample due to uncertainty.

Due to identification of Cs-137 in a pipe removed from this TU, 37 biased samples were collected from the bottom of the trench. No exceedances. Low to moderate concern due to unusually low variability for Bi-214. However, this site was a Cs-137 site. Resample due to uncertainty.

One pipe segment had Cs-137 above release criteria, so 23 biased samples were collected along the trench bottom. No contamination found. However, due to the low variability of the Bi-214 data, the lack of an off-site lab sample for the FSS data set, and the scan/static inconsistencies (including no dates for the static survey), this SU should be resampled.

Resample. (no date for statics, statics inconsistent with TU 96; no biased samples; low variability in Bi-214 results.)  
1 event

	0		5.8	
	0		5	
	0			

TU097	2	KB, DG	FSS_SYS has low variability for Ac-228 and Bi-214 compared to characterization and FSS_1. However, K-40 shows the opposite (more variability). FSS_SYS samples appear to be a different population.
TU098	2	DK, KB, DG	K-40 - mean for Final is highest and less variable. Seems odd that FSS would have a different mean from the others. Ac-228 and Bi-214 have similar means, but less variability. for FSS_SYS. No FSS Bias samples collected. Negative CS-137 values; Ac-228 and Bi-214 mean is higher and more variable for 1/13/09 event as compared to others appears to be a different population.
TU099	2	DK, KB, DG	Cs-137 samples show unusually low variability. K-40 outliers. No FSS_Bias samples



<p>Bias sample plots for Ac-228, Bi-214, and K-40 have slope breaks, indicating multiple populations. Form notes, "Samples 9 to 79 show low concentrations of Bi-214 and Ac-228. Samples 9 to 40 were collected on 08/19/2008. Samples 41 to 79 were collected on 08/20/2008. These samples were counted on 08/21/2008, 08/22/2008, and 08/25/2008. These samples were not biased to a specific location, but were distributed along the bottom of the trench to investigate potential leaks from the pipes. These samples do not appear to be representative of conditions at TU097. The small volumes of soil removed to remediate areas of elevated activity would not result in changes to the entire distribution." KB notes one inconsistent reference to TU 096.</p>	7
<p>Slope break on all 3 - indicates two populations.</p>	6
<p>K-40 plots have slope breaks, as do characterization samples for Ac-228 and Bi-214, suggests multiple populations</p>	15

Form notes: "Static survey date and time not provided in SUPR.

Gamma static dataset inconsistent (low variability) with FSS and gamma scan dataset. Gamma static measurements do not appear to represent conditions at TU096. Gamma scan results consistent with FSS dataset and inconsistent with gamma static dataset." and "No measurements above the investigation level were identified during the performance of gamma scans in Trench Unit 97. Seventy-nine investigative samples were collected along the trench bottom at 3-foot intervals because pipe sediment samples identified cesium-137 (Cs-137) activity at 0.17977 to 0.26670 pico Curie per gram (pCi/g) and radium-226 (Ra-226) activity at 1.8063 to 3.4019 pCi/g. Six of the investigative sample results identified Ra-226 activity to be present at 1.8799 to 2.4089 pCi/g."

Form states, "Reported gamma static counts are suspect; ranged within an unusually narrow band between 4,211 and 4,632 gcpm. No reviewer or review date reported. Gamma static counts are not consistent with the reported gamma scan range and FSS dataset. " Also, "Scan range reported as 2,900 to 9,400 gcpm, apparently exceeding the investigation level of 7,048 gcpm without further explanation. This gamma scan range is not consistent with the gamma static counts, but could be consistent with the FSS dataset. "

Form notes: " Static survey date and time not provided in SUPR. Static results reported low variability, inconsistent with gamma scan results and Final Systematic dataset."

7 samples noted to be consistent.	Form notes, "Initial Bias and other bias results display different characteristics from other Bias, Characterization and FSS samples." and for K-40, " Notes: FSS sample 129 had a high result different from other samples." For Ac-228, there were several biased sample results at or below 0.	1
	Form states about first samples, " The Visual Sample Plan (VSP) was used to generate 18 systematic sample locations (samples 1 to 18) based on a random start point and a triangular grid. Four of the sample results identified radium-226 (Ra-226) activity to be present at 1.7536 to 2.7581 picocuries per gram (pCi/g). Based on this information, 29 additional samples were collected to further characterize the trench. Characterization sampling identified five additional locations where Ra-226 activity was identified to be present above the release criteria, at 1.5349 to 3.7863 pCi/g. "	0
Form notes only 2 samples, inconclusive	Forms note for Bi-214 and Ac-228: "Third set of characterization data shows a different distribution from other data."	1

J Cunningham		1
	C Hughes	1
D DeLong		1

<p>Form notes, "Based on the findings of this evaluation, evidence of potential data falsification was found. It is unlikely the Biased Samples 9 to 79 represent actual conditions within TU097." KB notes that the inconsistent static survey data also indicates probable falsification.</p>	<p>1</p>
<p>Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.</p>	<p>1</p>
<p>Inconsistent statics, no final bias samples, third set of characterization data has different distribution.</p> <p>22 sampling events - Results for Ac-228, B-212, and Bi-214 have different variability for the Sys_1 2/2/09 sampling event. Similar to S0119. Cs-137 different for the 11/13/08, 5/13/09, 6/12/09 and 6/18/09 events.</p>	<p>1</p>

No date for Statics.

No sampler name.

No static survey date and  
time, no sampler/surveyor  
name

Resample. (no date for statics, statics inconsistent with TU 97; no biased samples; low variability in Bi-214 results; falsification noted by Navy.) . K-40 FSS different population. Ac-228 and Bi-214 appear to be different populations at different times.

Recommend resample to confirm ROC concentrations (statics inconsistent with gamma scan data set, low variability in Bi-214 results, no biased samples)

Some samples not analyzed within 2 weeks. Cs-137 remediation, Highest Cs-137 concentration recorded in Parcel G, but unusually low Cs-137 variability. Too many rounds of excavation. Inconsistent statics, different data distributions. Resample to confirm ROC concentrations

		<p>LL removed this bc Scott explained on 10/12 call - Form states, " Onsite/offsite data are comparable (well within a factor of 10x). " Not clear what this means.</p>	4	
			11	



TU100	2	KB, DG	Only one data set - FSS_SYS. Bi-214 samples have low variability and all results within a low range. No bias samples collected.
TU101		DK, KB, DG	Ac-228 and K-40 FSS_SYS have greater variability than SYS_1 or characterizations sets. Bi-214 characterization samples appear to be different population (lower variability, smaller data range). No FSS_Bias samples. Form notes: "Sample distribution of Final Systematic samples is slightly more variable compared with other sample types of Bias and Characterization. One outlier was identified for Bi-214 and Ac-228."
TU102	2	DK, KB	Ac-228, Bi-214, K-40 FSS_SYS have greater variability than other two data sets, while characterization samples have less variability. Cs-137 characterization data has the most variability. No FSS_Bias. Form notes: "Final Systematic sample distribution more variables compared to Bias and Characterization samples for Ac-228, Bi-214, and K-40."

All 3 plots have slope breaks, suggest more than one population in FSS_SYS.	1
Ac-228, Bi-214, K-40 FSS_SYS have slope break, indicating 2 populations. Unusually low range of results, variability for Cs-137 samples.	2
Ac-228, Bi-214, K-40 FSS_SYS have slope breaks, indicating 2 populations. Unusually low range of results, variability for Cs-137 samples. Form notes: "The graph is more vertical than expected for the Final Systematic Ac-228 samples."	2

Form notes: "No signature and date from site RSO was recorded on this survey. No gamma scan data was available for review to compare with the FSS samples specific dataset static/scan results." Also no signature for static survey.

Form notes: "The scan survey was performed on 07/19/2008 Scan range for 2350-1 Instrument is 2,970 – 6,590 cpm, exceeding the 3-sigma investigation level for 2350-1 instrument (6,161 cpm). No signature and date from site RSO was recorded on this survey. No gamma scan data was available for review to compare with the Final Systematic samples specific dataset static/scan results." For statics, "The highest count was recorded at 5,842 cpm for sample location 029." Unclear, but bias samples should probably have been collected.

Form notes: "The scan survey was performed on 07/11/2008 Scan range for 2350-1 Instrument is 2,310 – 5,960 cpm. The 3 sigma investigation level for 2350-1 Instrument was 6,161 cpm. No signature and date from the site RSO was recorded on this survey. No gamma scan data was available for review to compare with the Final Systematic samples specific dataset static/scan results." FORM for TU101 notes about TU102: "The static data results for TU 102 is inconsistent compared with the adjacent trenches. The lowest static count was reported for TU102 at 2,471 cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highest static count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU102. "

Form says consistent.		1
Form notes: "Data comparison is relatively close for Ac-228, Bi-214, and K-40."	Form notes: "The data range for K-40 from 4.68 through 14.96 pCi/g."	1
Form notes: "Data comparison is relatively close for Ac-228, Bi-214, and K-40."Data inconsistent with Final Systematic sample (046) for the K-40 results. Onsite result was 20.29 pCi/g while the offsite result was 8.2 pCi/g."	Form notes: "The data range for K-40 from 5.06 through 20.22 pCi/g."	TU102

R Zahensky		
R Zahensky		1
1	R Zahensky	

	1
No gamma scan data available. Should have been in SUPR.	1
Unusually low variability for Cs-137. Missing bias samples. Possibly inconsistent statics. Missing gamma scans.	1

No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.

No Site RSO signature, no FSS\_Bias. Gamma scan data suggest statics should have been collected.

No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.

No biased samples. Missing signature and lack of gamma scan data is troubling. Low variability in B-214 data. Only 1 sampling event FSS-SYS. Need to resample.

Should resample due to uncertainty - lack of gamma scan data, no FSS\_Bias samples, different populations in data sets.

Cs-137 remediation, but low Cs-137 variability. K-40 may be from diff pop, inconsistent off-site data, missing bias samples, no gamma scan data. Resample to confirm ROC concentrations



	0		4.7	
	0		6	
<p>See TU101 form, which notes "The static data results for TU 102 is inconsistent compared with the adjacent trenches. The lowest static count was reported for TU102 at 2,471 cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highest static count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU102. " Is this relevant for TU101 or 102?</p>			7	

TU102	2	DK, KB	Ac-228, Bi-214, K-40 FSS_SYS have greater variability than other two data sets, while characterization samples have less variability. Cs-137 characterization data has the most variability. No FSS_Bias. Form notes: "Final Systematic sample distribution more variables compared to Bias and Characterization samples for Ac-228, Bi-214, and K-40."
TU103	1	DK, DG	
TU104	2	DK, DG	
TU106	1	DK, DG	
TU107	1	DK	

<p>Ac-228, Bi-214, K-40 FSS_SYS have slope breaks, indicating 2 populations. Unusually low range of results, variability for Cs-137 samples.</p> <p>Form notes: "The graph is more vertical than expected for the Final Systematic Ac-228 samples."</p>	2
<p>abnormally narrow range of measurement values.</p>	

Form notes: "The scan survey was performed on 07/11/2008 Scan range for 2350-1 Instrument is 2,310 – 5,960 cpm. The 3 sigma investigation level for 2350-1 Instrument was 6,161 cpm. No signature and date from the site RSO was recorded on this survey. No gamma scan data was available for review to compare with the Final Systematic samples specific dataset static/scan results." FORM for TU101 notes about TU102: "The static data results for TU 102 is inconsistent compared with the adjacent trenches. The lowest static count was reported for TU102 at 2,471 cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highest static count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU102. "

Scan data elevated compared to sample data/several samples may have been substituted, Gamma Scan Survey performed on 05/28/2009 at 13:40 on the same day as Final

Systematic Sample collection.

Gamma scan dataset inconsistent with static data. Scan Data range 2,910 – 8,510 cpm, exceeding the investigation level of 7,048 cpm. Static data range 3,100 – 3,400 cpm.

Gamma Scan Survey performed on 05/28/2009 at 13:40 on the same day as Final Systematic Sample collection.

Scan survey performed on 09/30/2008 at 07:40 prior to FSS sample collection. Gamma static dataset inconsistent with scan data and FSS sample dataset. Static range from 3,900 – 4,300 cpm with a STDEV of 136 cpm. Scan data has a range of 1,170 – 8,170 cpm exceeding the investigation level of 4,078 cpm.

Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (standard deviation of the static measurements is too small at 97 cpm) with scan data and Final Systematic sample dataset. Scan survey performed on 04/22/2009 at 08:00 prior to Final Systematic sample collection. Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.

Scan survey performed on 10/14/2008 at 08:15 prior to Final Systematic sample collection. Gamma scan contained measurements greater than the 3-sigma threshold. No date or time recorded for static survey in SUPR. Gamma static dataset consistent with scan data and Final Systematic sample dataset

Form notes: "Data comparison is relatively close for Ac-228, Bi-214, and K-40."Data inconsistent with Final Systematic sample (046) for the K-40 results. Onsite result was 20.29 pCi/g while the offsite result was 8.2 pCi/g."	Form notes: "The data range for K-40 from 5.06 through 20.22 pCi/g."	1
		0
		0
		0
		0

R Zahensky		1
	C Hughes	1
	C Hughes	1
	C Hughes	1
	C Hughes	1

Unusually low variability for Cs-137. Missing bias samples. Possibly inconsistent statics. Missing gamma scans.	1
1) Sampler Namer Not provided in SUPR. 2) Biased samples have low activity concentration when compared with the FSS samples	
1) Sampler Namer Not provided in SUPR. 2) No Bias Samples collected when warranted by Scan measurements, samples may have been collected somewhere else within the trench	1
1) Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (standard deviation of the static measurements is too small at 97 cpm) with scan data and Final Systematic sample dataset.. 2) Scan survey performed on 04/22/2009 at 08:00 prior to Final Systematic sample collection. Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.	0
Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.	0

No signature and date from  
site RSO for gamma scan and  
statics. No gamma scan data  
available in SUPR.

yes, No BIAS Samples  
collected based on scan data



Cs-137 remediation, K-40 may be from different pop, Recommend Resample to confirm ROC concentrations

Biased Samples may have been collected somewhere else within the trench or elsewhere, Resample to confirm ROC concentrations,

No Bias samples collected when warranted based on Scan Survey. Resample to confirm ROC concentrations.  
1 event

Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations

Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations

See TU101 form, which notes "The static data results for TU 102 is inconsistent compared with the adjacent trenches. The lowest static count was reported for TU102 at 2,471 cpm compared to 3,300 cpm for TU100 and 4,366 cpm for TU070. The highest static count was reported at 6,531 cpm for TU100 compared to 5,377 cpm for TU102. " Is this relevant for TU101 or 102?			7	
	0		14	
	0			
	0			
			9	

TU108	2	DK, DG	Cs-137 has more variability and different mean for the 5/30/08 event compared to the 5 events
TU111	2	DK, DG	
TU115	2	KB, DK, DG	Bi-214 and Ac-228 indicate multiple populations by date
TU116	2	DK, DG	K-40, Ac-228, Bi-214 population on 4/15/09 appears different from the other 5 events
TU117	2	DK, DG	
TU118	1	DK, DG	
TU119	1	DK, DG	
TU121	2	DK, DG	

Different slope in line on final. One way falsification caught in 2012 was K-40 for FSSR not the same as original. Slope for Ac-228 looks like 2 different populations in biased samples.	

<p>Scan survey performed on 05/06/2009 at 13:50 after the commencement of Final Systematic sampling. Scan range is 2,390 – 7,900 cpm, exceeding the 3 sigma investigation level of 7,048 cpm.</p>
<p>Scan measurements above investigation threshold inconsisten w/ FSS samples, samples could have been taken in areas with lower count rate in trench. DK - 115 looks ok to me.?</p>
<p>Scan survey performed on 04/27/2009 at 08:45 prior to the commencement of Final Systematic sampling. Some scan measurements exceeded the scan threshold.</p>
<p>Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.</p>
<p>1) Static survey date and time not provided in SUPR. Static results reported low variability inconsistent with gamma scan results and lab data. 2) Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.</p>
<p>Gamma static counts ranged within a narrow band between 3,984 gcpm and 4,747 gcpm and are not consistent with the gamma scan range or FSS dataset. Performed by a suspect worker; no reviewer or review data reported. Performed on 01/24/2009 at 09:40h by a suspect worker. Scan range listed as 3,300 – 7,700 gcpm, apparently exceeding the IL of 7,048 gcpm without further explanation. This gamma scan range is not consistent with the range of gamma static counts described above, but is consistent with the FSS dataset.</p>

		0
		1
		1
		0
		1
		0
		1
		1

	C Hughes	1
J Cunningham		
B Evans		1
	C Hughes	1
J Cunningham		1
	C Hughes	0
J Cunningham		
J Cunningham		1

<p>Scan survey performed on 05/06/2009 at 13:50 after the commencement of Final Systematic sampling. Scan range is 2,390 – 7,900 cpm, exceeding the 3 sigma investigation level of 7,048 cpm. No Bias Samples were collected</p>	1
<p>K-40 Final sample set appears different from earlier. Ac-228 shows 2 different populations, scan measurements higher earlier inconsistent with final sample results</p>	
<p>Scan survey performed on 04/27/2009 at 08:45 prior to the commencement of Final Systematic sampling. Some scan measurements exceeded the scan threshold. K-40, Ac-228, Bi-214 population on 4/15/09 appears different from the other 5 events</p>	0
<p>Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.</p>	
<p>1) Static survey date and time not provided in SUPR. Static results reported low variability inconsistent with gamma scan results and lab data. 2) Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.</p>	
<p>Bi-214 have different variability for the Sys_1 2/2/09 sampling event.</p>	1
<p>Some of the samples collected appear to be from a different population</p>	1



yes, No BIAS Samples  
collected based on scan data

yes, No BIAS Samples  
collected based on scan data  
for FSS

No Bias Samples were collect when warrented as part of FSS. Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations. Cs-137 varies significantly during the 5/30/08 event due to negative activity levels for this event. Why negative measurements? Operator?

Cs-137 remediation, work performed by suspect worker, only 1 sampling event

Close to impacted area, had a lot of remediation, Difficult to excavate more. Suspect worker Identified

Biased samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations

Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations. Only 1 sampling event - FSS-SYS

Only 1 sampling event - FSS-SYS

Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations

Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations

Cs-137 varies significantly during the 5/30/08 event due to negative activity levels for this event. Why negative measurements? Operator?	0			
	0		2	
	1	Donna recommended for PCA	1	
	0			
	0	Dave left overall score blank, so I just filled in 1		
		May not be enough to justify resampling. Any other flags?		
	0			

TU124	2	DK, DG	
TU151	1	DG, DK	Box Plots show concern
TU204	2	DK, DG	Box Plots indicate Narrow Range, but scan data indicates a larger range

	3
	1

Static survey date and time not provided in SUPR.

Gamma static dataset inconsistent with scan data and Final Systematic sample dataset

The static gamma measurements, which were collected before sampling, do not reflect the variability observed in either the range of the scan results or the analytical results. The scan range and sample activity range appear plausible. It should be noted that scan results above the investigation level were apparently never investigated or sampled.

Static range = 3,748 – 4,220 cpm

Scan range = 1,390 – 8,240 cpm (investigation level = 7,048 cpm)

Sample activity range (K-40) = 3.5 – 13.5 pCi/g Scan range = 1,390 – 8,240 cpm

(investigation level = 7,048 cpm) Scan survey performed on 07/06/2012 at 10:00

prior to Final Systematic sample collection.

Gamma scan dataset inconsistent with static data and/or Final Systematic sample dataset.

Performed by a suspect worker; no reviewer or review data reported.

The scan survey was performed on 06/15/2011. Scan range for 2350-1 Instrument is 4,000 to 7,610 cpm. The 3 sigma investigation level for 2350-1 Instrument was 8,014 cpm. No signature and date from the site RSO was recorded on this survey.

No raw scan data was provided in the SUPR.

	FSS samples appear to be from a different population	1
		1
		1

D DeLong		1
J Cunningham		
J Cunningham		



<p>1)Gamma scan dataset inconsistent with static data and/or Final Systematic sample dataset. Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations</p>	
<p>samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations</p>	

yes, No BIAS Samples collected based on scan data for FSS

Suspect Worker, FSS Samples appear to be from a different population of samples. Samples may have been collected somewhere else , Resample to confirm ROC concentrations

6 RAS events followed by 2 FSS events. Variability for Ac-228 and Bi-214 for the final 2 FSS events (6/22/09 and 7/6/09) is smaller than the RAS events (1/29/09 thru 6/11/09) and activity levels drop below clean-up levels over the 11 day period between RAS and FSS.

Suspect Worker, samples may have been collected somewhere else, only 1 sampling event? Resample to confirm ROC concentrations

Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations

		Not sure		
	1	Confirming Dave wants PCA?	8	
	1	Confirming Dave wants PCA? Or already so obvious we don't need it?		

Trench Unit	Signs of falsifying (1=Yes, 0=no)
TU067	1
TU068	1
TU069	1
TU071	1
TU072	1
TU073	1

Signs of falsification summary
<p>1 -RAS results look suspicious due to very low variability</p> <p>2 - Review form indicates allegations associated with this TU: Former Worker Allegation: RSY-2 laborers missing the required number of samples. Taylor told them to go get a sample "from anywhere." They went behind the Conex to another pad and got an unrelated "false" sample. Allen and Reggie</p> <p>3 - missing COCs and raw scan data in reports</p>
<p>1 -RAS results look faked due to very low variability</p> <p>2 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports</p> <p>3 - Multiple excavations, adjacent to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2</p>
<p>1 -RAS results for all radionuclides have low variability.</p> <p>2 - Ac-228 and Bi-214 RAS results are from a different population than all other surveys/samples</p> <p>3 - SUPRs missing COCs, RSO signatures, sampler names, and raw scan data in reports</p> <p>4 - Multiple excavations, near to TU067 where worker allegations specify excavated soil was not scanned properly in RSY2, DG K-40 more variable on 9/19/07 and 10/17/07 than other sampling events.</p> <p>5 - Worker involved in allegations included in sample team</p> <p>6 - K-40 more variable on 9/19/07 and 10/17/07 than other sampling events.</p>
<p>1 - Scan survey data not available for review</p> <p>2 - Static data range not provided in Data Eval Form.</p> <p>3 - No RSO signature and date provided for static or scan data</p>
<p>1 - Inconsistent scan and static data; highest count for static survey was 4,279 cpm where scans ranged from 3,890 - 6,720 cpm2 - SUPR missing COCs</p>
<p>1 - Scan and Static data inconsistency; narrow range of static data values which is not consistent with environmental monitoring.</p> <p>2 - RSO signature on scan and static data results is missing</p>


TU074	1
TU075	1
TU076	1
TU078	1
TU079	1
TU080	1
TU082	1
TU083	1
TU085	1
TU087	1
TU096	1
TU097	1



<p>1 - Scan and static data are inconsistent. Static results ranged from 4,300 - 5,800 cpm; scan ranged from 1,630 - 6,750 cpm.</p> <p>2 - Low values in scan data unusual because the low counts per minute are within a range that is below background.</p>
<p>Inconsistent static data (4,200 - 6,200 cpm) and scan data (1,370 - 7,720 cpm), scan data includes results below background levels.</p> <p>Suspect worker involved in data collection.</p>
<p>1 -Static and scan data inconsistent. Static ranged from 4,452 - 4,914; scan data ranged from 3,000 - 7,000 cpm. Range for static data is too small indicating static data is falsified.</p> <p>2 - All surveys/sample collection results have unusually low and/or non-detect results for Ac-228. This indicates either poor data quality or falsification.</p>
<p>1 -Static and scan data inconsistent. Static ranged from 3,953 - 4,543; scan data ranged from 3,000 - 7,000 cpm. Range for static data is small.</p> <p>2 - Scan data is reported to be exactly the same as TU076 (3,000 - 7,000 cpm)</p> <p>3 - Unclear whether Scan/Static personnel S. Brown is the same as Emitt Brown from NRC list</p> <p>4 - K-40: mean stays the same but spread up and down varies between events</p>
<p>Static data (5,326 - 5,943 cpm) and Scan data (3,430 - 6,790 cpm) are not consistent, static data has very narrow range of values compared to what would be expected for environmental conditions.</p>
<p>Static and scan data inconsistent. Static ranged from 6,089 - 7,126 cpm; Scan ranged from 4,250 - 6,500 cpm</p>
<p>1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification.</p> <p>2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).</p>
<p>The FSS results demonstrate high variability in K-40 results but low variability in Ac-228 and Bi-214.</p> <p>Pb-214 (daughter of Ra-226) noted to have two populations</p> <p>Data Eval Form states Static and Scan data (2,000 - 5,000 cpm) are inconsistent. Static data range not provided.</p> <p>Data Eval Form states Static data are potentially falsified but no evidence regarding sampling falsification is available.</p> <p>Static scan date and time not provided in SUPR</p> <p>Scanning was performed after FSS samples collected.</p>
<p>Mean and variability of bias samples less than FSS_SYS and characterization samples. Appear to represent a different population. Multiple rounds of excavation. On- and off-site samples differ by more than 10x.</p>
<p>10x difference between on- and off-site lab in 2 samples. Unusually small variability in Bi-214 data set.</p>
<p>Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.</p>
<p>Form notes, "Based on the findings of this evaluation, evidence of potential data falsification was found. It is unlikely the Biased Samples 9 to 79 represent actual conditions within TU097." KB notes that the inconsistent static survey data</p>



TU098	1
TU099	1
TU101	1
TU102	1
TU103	1
TU104	1
TU106	1
TU107	1
TU108	1
TU115	1
TU116	1
TU117	1
TU121	1
TU124	1
TU088	0
TU089	0
TU091	0
TU092	0
TU093	0
TU118	0
TU100	
TU102	
TU111	
TU119	
TU151	
TU204	

Statics inconsistent with FSS and gamma scan data set. Low variability in Bi-214 results. No Biased samples.
Inconsistent statics, no final bias samples, third set of characterization data has different distribution.
22 sampling events - Results for Ac-228, B-212, and Bi-214 have different variability for the Sys_1 2/2/09 sampling event. Similar to S0119. Cs-137 different for the 11/13/08, 5/13/09, 6/12/09 and 6/18/09 events.
No gamma scan data available. Should have been in SUPR.
Unusually low variability for Cs-137. Missing bias samples. Possibly inconsistent statics. Missing gamma scans.
1) Sampler Namer Not provided in SUPR. 2) Biased samples have low activity concentration when compared with the
1) Sampler Namer Not provided in SUPR. 2) No Bias Samples collected when warranted by Scan measurements, samples may have been collected somewhere else within the trench
1) Static survey date and time not provided in SUPR. Gamma static dataset inconsistent (standard deviation of the static measurements is too small at 97 cpm) with scan data and Final Systematic sample dataset.. 2) Scan survey performed on 04/22/2009 at 08:00 prior to Final Systematic sample collection. Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent
Scan range exceeds the 3 sigma scan threshold. Scan data inconsistent with FSS sample dataset and static data.
Scan survey performed on 05/06/2009 at 13:50 after the commencement of Final Systematic sampling. Scan range is 2,390 – 7,900 cpm, exceeding the 3 sigma investigation level of 7,048 cpm. No Bias Samples were collected
K-40 Final sample set appears different from earlier. Ac-228 shows 2 different populations, scan measurements higher
Scan survey performed on 04/27/2009 at 08:45 prior to the commencement of Final Systematic sampling. Some scan measurements exceeded the scan threshold.
K-40, Ac-228, Bi-214 population on 4/15/09 appears different from the other 5 events
Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.
Some of the samples collected appear to be from a different population
1)Gamma scan dataset inconsistent with static data and/or Final Systematic sample dataset. Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations
1) Static survey date and time not provided in SUPR. Static results reported low variability inconsistent with gamma scan results and lab data. 2) Scan survey was performed on 10/31/08 at 09:15 prior to FSS sample collection. Gamma scan dataset not consistent with static dataset.
Unusually low variability for Cs-137. Missing bias samples. Possibly inconsistent statics. Missing gamma scans.
Bi-214 have different variability for the Sys_1 2/2/09 sampling event.
samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations



Trench Unit	Failure to follow workplan (1=Y, 0=N)	Signs of failure to follow workplan
TU069	1	SUPRs missing COCs, RSO signatures and dates, and scan data
TU071	1	<p>1 - RSO signature missing on static and scan data</p> <p>2 - Section 4 of Data Eval Form states "No gamma scan data was available for review to compare with the FSS samples specific dataset static/scan results."</p>
TU072	1	COCs not provided in SUPR as documentary evidence of sample integrity, date and time of collection and arrival at laboratory.
TU074	1	Scan data collected after FSS sample collection which is a departure from the Work Plan.

Comments - Other

This survey unit is suspect for the following reasons:

- 1 - RAS results do not have normal variability and are from different population than other surveys for Ac-228 and Bi-214 - suspect for falsification
- 2 - K-40 FSS results look like they are from a different population than other surveys
- 3 - COCs and names of samplers missing in SUPR
- 4 - No RSO signatures on survey results
- 5 - Raw scan data missing from SUPR
- 6 - Worker involved in allegations performed work at this TU

- 1 - Remediation was performed due to Cs-137, the time series plots show that most of the characterization results for Cs-137 were at or near zero, or were negative values. This indicates a data quality issue, and thus, un-reliable data.
  - 2 - Gamma scan data missing, and no RSO signature and date on static and scan data.
- Recommend resample to confirm ROC concentrations for Ra-226 and Cs-137

- 1 - Scan and Static data are inconsistent
- 2 - SUPRs do not contain COCs for samples collected. Without this documentary evidence, the integrity, location, date, time or evidence of who had custody of the samples is missing. Therefore, the data is not defensible and not usable for decision making.

- 1 - TU074 was not remediated but is adjacent to TUs 81 and 83 which did have contamination.
- 2 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shop, and offices, a trades shop, and general store. No contamination is expected to have been released from this building; however, TU075 which was also connected to Bldg. 401 did have contamination.
- 3 - Scan and Static data are inconsistent, with unusually low results in scan data and in FSS data.
- 4 - Scan was performed after FSS samples collected.
- 5 - Sampler not identified in SUPR, person responsible for gamma scans and static measurements is listed on the NRC petition as a suspect worker.




TU075	1	Section 4 of the Data Eval Form states that there was no mention of pipe swipe surveys or sediment sampling in manholes. This would indicate a deficiency in the investigation and a departure from the Work Plan.
TU076	1	Range of cpm values for static data is too small indicating static data may have been collected at only one or a few locations.
TU083	1	Scan data collected after FSS sample collection.
TU087	1	No bias samples collected. Gamma scan conducted after FSS samples were collected.
TU089	1	No bias samples collected.

<p>1 - Data Eval Form noted that there were negative results for Ra-226, low K-40 concentrations, and two results for Ac-228 at or below 0 pCi/g. Reviewer comment: this could indicate poor data quality and/or falsification.</p> <p>2 - Static and scan data are inconsistent. Static results ranged from 4,200 - 6,200 cpm; scan data ranged from 1,370 - 7,720 cpm: Low values in scan data are unusual because these low values are significantly lower than background.</p> <p>4 - Sanitary sewer is associated with Bldg 401, used for storage of sealed sources, a maintenance shop, and offices, a trades shop, and general store. The narrative states that no contamination was found on surfaces or drains in the building, therefore it is not expected that contamination released from this building.</p> <p>5 - Section 4 of the Data Eval Form discusses the contamination that was found in this TU, despite the purported lack of contamination in Bldg 401. The narrative also states that there was no mention of pipe swipe surveys or sediment sampling in manholes, therefore the investigation did not follow the Work Plan and is deficient. This is important to note because contamination was found in this trench.</p> <p>6 - Suspect worker involved in static/scan surveys</p>
<p>1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings.</p> <p>2 - Adjacent TUs 078, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results.</p> <p>3 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification.</p> <p>4 - Suspect worker involved in data collection.</p> <p>5 - Probable data quality issues with low Ac-228 results.</p> <p>Data Eval Form states TU076 is adjacent to Bldg 411. Similarly, TU078 and TU080 are also adjacent to Bldg. 411. Samples collected from all three TUs include several Ac-228 results that are at or below 0, and similarities were</p>
<p>1 - Sanitary sewer is associated with Bldg 401. Data Eval Form states that Bldg 401 was not identified in the HRA but that after it was leased, sealed radiological sources (dials and gauges) were stored in the building. Data Eval Form also states no contamination was identified on surfaces or drains, therefore there is no reasonable potential that Bldg 401 activities contaminated the sewer system. Note: Based on revelations about building scan falsification issues, the reviewer questions how thorough or accurate surveys done on surfaces or drains in this building were.</p> <p>2 - Adjacent TUs include 076, 123, and 124.</p> <p>3 - Static and scan data are inconsistent; static results were not provided but scan data ranged from 2,000 - 5,000 cpm. Even number cpm values is suspect.</p> <p>4 - Scan data collected after FSS. This is suspect for falsification of Scan and Static measurement data.</p>
<p>This could be a data set where the scans were manipulated to remove highs, and then the FSS samples were biased to areas with low gamma scan result, but the form indicates that the gamma scan was performed after the FSS samples were collected. 7 manholes removed from this TU. Elevated gamma survey results were identified for Manholes</p>
<p>1 event. Otherwise no concerns</p>



TU093	1	No date for Statics.
TU096	1	No bias samples collected. No date for statics.
TU097	1	No date for Statics.
TU098	1	No sampler name.
TU099	1	No static survey date and time, no sampler/surveyor name
TU100	1	No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.
TU101	1	No Site RSO signature, no FSS_Bias. Gamma scan data suggest statics should have been collected.
TU102	1	No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.
TU102	1	No signature and date from site RSO for gamma scan and statics. No gamma scan data available in SUPR.
TU104	1	yes, No BIAS Samples collected based on scan data
TU108	1	yes, No BIAS Samples collected based on scan data
TU119	1	
TU121	1	yes, No BIAS Samples collected based on scan data for FSS
TU073	0	
TU078	0	

One pipe segment had Cs-137 above release criteria, so 23 biased samples were collected along the trench bottom. No contamination found. However, due to the low variability of the Bi-214 data, the lack of an off-site lab sample for the FSS data set, and the scan/static inconsistencies (including no dates for the static survey), this SU should be resampled.
Resample. (no date for statics, statics inconsistent with TU 96; no biased samples; low variability in Bi-214 results.) 1 event
Resample. (no date for statics, statics inconsistent with TU 97; no biased samples; low variability in Bi-214 results; falsification noted by Navy.) . K-40 FSS different population. Ac-228 and Bi-214 appear to be different populations at
Recommend resample to confirm ROC concentrations (statics inconsistent with gamma scan data set, low variability in
Some samples not analyzed within 2 weeks. Cs-137 remediation, Highest Cs-137 concentration recorded in Parcel G, but unusually low Cs-137 variability. Too many rounds of excavation. Inconsistent statics, different data distributions.
No biased samples. Missing signature and lack of gamma scan data is troubling. Low variability in B-214 data. Only 1 sampling event FSS-SYS. Need to resample.
Should resample due to uncertainty - lack of gamma scan data, no FSS_Bias samples, different populations in data sets.
Cs-137 remediation, but low Cs-137 variability. K-40 may be from diff pop, inconsistent off-site data, missing bias samples, no gamma scan data. Resample to confirm ROC concentrations
Cs-137 remediation, K-40 may be from different pop, Recommend Resample to confirm ROC concentrations
No Bias samples collected when warranted based on Scan Survey. Resample to confirm ROC concentrations. 1 event
No Bias Samples were collect when warrented as part of FSS. Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations. Cs-137 varies significantly during the 5/30/08 event due to
Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC
Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations
1 - TU is downstream from Building 274 used for decontamination training and offices, Building 322 used by NRDl for development of radiation detection instrumentation (no contamination found and building demolished), and Buildings 313, 313A used by NRDl for Instrumentaiton laboratory and as stockroom and storage areas.
1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings.
2 - Adjacent TUs 076, 080 also had several Ac-228 results that were at or below 0. In addition TU077 had the same Ac-228 low or at 0 results.
3 - Static and scan data are inconsistent; static results ranged from 3,954 - 4,543 cpm and scan data ranged from 3,000 - 7,000 cpm. Inconsistency, and reporting of exact same cpm range for scan data in TU 076 and TU078 is flag for falsification.
4 - It is unclear whether suspect worker was involved in data collection.
Data Eval Form states TU076 is adjacent to Bldg 411. Similarly, TU078 and TU080 are also adjacent to Bldg. 411.



TU080	0	
TU082	0	
TU085	0	
TU088	0	
TU091	0	
TU092	0	
TU106	0	
TU107	0	
TU116	0	

<p>1 - Sanitary sewer is associated with Bldg 411. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079.</p> <p>2 - Adjacent TUs 076, and TU087 (also adjacent to Bldg. 411); and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0.</p> <p>3 - Static and scan data are inconsistent; static results ranged from 6,089 - 7,126 cpm and scan data ranged from 4,250 - 6,500 cpm.</p> <p>4 - Suspect worker involved in data collection.</p> <p>5 - Probable data quality issues with Ac-228</p>
<p>1 - RAS Samples 56 and 58 were collected 05/05/08, sample 57 listed as collected on 05/08/08; reports however, were generated on 05/05/08. Record of collection date for sample 57 may be typographical, or may indicate falsification.</p> <p>2 -Static data (5,611 - 6,564 cpm) were inconsistent with Scan data (4,750 - 6,920 cpm).</p> <p>3 - Suspect worker involved with data collection.</p> <p>4 - TU082 is adjacent to TUs 077, 080, 081 which all included several Ac-228 results at or below 0. Data Eval Form indicates Bi-212 and Pb-212 in the Th-232 decay series were consistent with other sample results in TU082. This may indicate a data quality issue with the analysis and reporting of Ac-228.</p>
<p>Recommend resampling to confirm ROC concentrations for several reasons - inconsistent off-site lab results, mean and variability of bias samples inconsistent with FSS_SYS samples that appear to be a different population, evidence for</p>
<p>Lower variability in FSS-SYS and FSS-Bias may indicate successful remediation or could indicate potential falsification (narrow range unusual). Low-to moderate concern. May be candidate for Tier 2 resampling. K-40: 1 event (3/4/08 RAS)</p>
<p>Box plots and Q-Q plots indicate different populations. Less variability in Bi-214 samples may mean success in remediating this SU, but could also mean falsification. Resample due to uncertainty.</p>
<p>Due to identification of Cs-137 in a pipe removed from this TU, 37 biased samples were collected from the bottom of the trench. No exceedances. Low to moderate concern due to unusually low variability for Bi-214. However, this site</p>
<p>Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations</p>
<p>Samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations</p>
<p>Biased samples may have been collected somewhere else within the trench, Resample to confirm ROC concentrations</p>





TU067		Missing data and info in SUPRs
TU068		
TU079		
TU103		
TU111		
TU115		
TU117		
TU118		

This survey unit is suspect for the following reasons:

- 1 - Former worker allegations regarding screening of soil from this trench unit at the RSY2. This indicates a high potential that FSS results could also have been falsified
- 2 - RAS results do not have normal variability - suspect for falsification
- 3 - K-40 FSS results look like they are from a different popultaion than other surveys
- 4 - COCs and names of samplers missing in SUPR
- 5 - No RSO signatures on survey results
- 6 - Raw scan data missing from SUPR

This survey unit is suspect for the following reasons:

- 1 - Variability in sample results for FSS low - suspect for falsification
- 2 - K-40 FSS results look like they are from a different population than other surveys
- 3 - COCs and names of samplers missing in SUPR
- 4 - No RSO signatures on survey results
- 5 - Raw scan data missing from SUPR

Recommend for re-sampling

- 1 - Sanitary sewer is associated with Bldg 411 and 439. Data Eval Form does not state what activities occurred in these buildings. HRA info is needed to evaluate potential for contamination of sewer lines/TU079.
- 2 - Adjacent TUs 076, 078, and TU108; and nearby TUs 077, 080, 082 also had several Ac-228 results that were at or below 0.
- 3 - Static and scan data are inconsistent; static results ranged from 5,326 - 5,943 cpm and scan data ranged from 3,430 - 6,790 cpm.
- 4 - Suspect worker involved in data collection.
- 5 - Probable data quality issues with Ac-228 results.

Biased Samples may have been collected somewhere else within the trench or elsewhere, Resample to confirm ROC

Cs-137 remediation, work performed by suspect worker, only 1 sampling event

Close to impacted area, had a lot of remediation, Difficult to excavate more. Suspect worker Identified

Suspect Worker samples may have been collected somewhere else within the trench, Resample to confirm ROC

Only 1 sampling event - FSS-SYS



TU124		
TU151		
TU204		yes, No BIAS Samples collected based on scan data for FSS

Suspect Worker, FSS Samples appear to be from a different population of samples. Samples may have been collected somewhere else , Resample to confirm ROC concentrations
6 RAS events followed by 2 FSS events. Variability for Ac-228 and Bi-214 for the final 2 FSS events (6/22/09 and 7/6/09) is smaller than the RAS events (1/29/09 thru 6/11/09) and activity levels drop below clean-up levels over the 11 day
Suspect Worker, samples may have been collected somewhere else, only 1 sampling event? Resample to confirm ROC
Suspect Worker, samples may have been collected somewhere else, Resample to confirm ROC concentrations

TU067	TU068	TU079	TU103	TU111	TU115	TU117	TU118	TU124	TU151	TU204